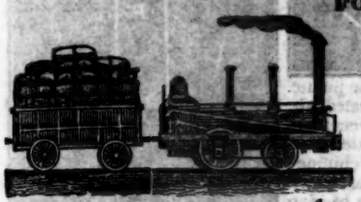
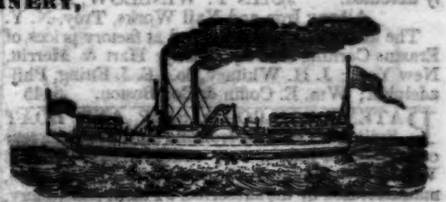
AMERICAN RAILROAD JOURNAL,

AND GENERAL ADVERTISER

FOR RAILROADS, CANALS, STEAMBOATS, MACHINERY, AND MINES.





ESTABLISHED 1831.

PUBLISHED WEEKLY, AT No. 23 CHAMBERS STREET, NEW YORK, AT FIVE DOLLARS PER ANNUM.

SECOND QUARTO SERIES, VOL. II., No. 4.] SATURDAY, JANUARY 24, 1846. [WHOLE No. 500, VOL. XIX.

HERRON'S PATENT AMERICAN RAILWAY TRACK,

As seen stripped of the top ballasting

HERRON'S IMPROVEMENTS IN RAILway Superstructure effect a large aggregate saving in the working expenses, and maintenance of railways, compared with the best tracks in use. This saving is effected—1st, Directly by the amount of the increased load that will be hauled by a locomotive, owing to the superior evenness of surface, of line and of joint. This gain alone may amount to 20 per cent. on the usual load of an engine.—2d, In consequence of the thorough combination, bracing, and large bearing surface of this track, it will be maintained in a better condition than any other track in use, at about one-third the expense.—3d, As action and reaction are equal, a corresponding saving of about two-thirds will be effected in the *wear* and *tear* of the *engines* and *cars*, by the *even surface* and *elastic structure* of the track.—4th, The great security to life, and less liability to accident or damage, should the engine or cars be thrown off the rails.—5th, The absence of jar and vibration, that shake down retaining walls, embankments and bridges.—6th, The great advantage of the high speed that may be safely attained, with ease of motion, reduction of noise, and consequently increased comfort to the traveller.—7th, The really *permanent* and perfect character of the Way, insuring regularity of transit. To which may be added the great increase of travel, that would be induced by the foregoing qualities to augment the revenue of the railroad.

The cost of the Patent track will depend on the quantity and cost of iron and other materials; but it will not exceed, even including the preservation of the timber, the average cost of the tracks on our principal railroads. Generally, the timber structure, fastenings and workmanship, exclusive of the cost of the iron rails, will be from $2,300 to $4,000 per mile. On this structure, rails of from 40 to 50 lbs. per yard, will be equal in effect to 60 and 70 lbs. rails laid in the usual way. The proprietors of a road, furnishing approved materials in the first instance, the undersigned will construct the track on his plan in the most perfect manner, with recent improvements, for one thousand dollars per mile. And he will farther contract to maintain said track for the period of ten years, furnishing such preserved timber and iron fastenings as may be required, and keeping said track in *perfect adjustment*, under any trade not exceeding 100,000 tons per annum, or its equivalent in passenger transportrtion, for *Two hundred dollars per mile per annum.** To insure the faithful performance of this contract, he will pledge one-fourth of the cost of construction, with the accruing interest thereon, regularly vested, until the completion of the contract. So that a company, by securing payment to the undersigned at the specified period, will have only $750 per mile to pay for the workmanship on the track, without any charge being made for the use of the patent, the subsequent payments, for maintenance of way, and amount withheld, being made from the large margin of profits that will result from its use.

JAMES HERRON.
Civil Engineer and Patentee.
No. 277 South Tenth St., Philadelphia.

* A general average of the repairs done on six of the most successful railroads in this country, for a period of from six to eight years' use has been found to exceed $625 per mile per annum, exclusive of renewal of rails. But few roads in this country carry as much as 100,000 tons per annum. When a road exceeds that quantity, the repairs due to the additional tonnage, up to 200,000 tons, will be charged at one mill per ton; over the latter, and not exceeding 300,000 tons, nine-tenths of a mill, etc. Where there are two tracks to maintain, a large reduction upon these rates will be made. 1y1

PATENT HAMMERED RAILROAD, SHIP and Boat Spikes. The Albany Iron and Nail Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscriber at the works, will be promptly executed. JOHN F. WINSLOW, *Agent.*

Albany Iron and Nail Works, Troy, N. Y.

The above spikes may be had at factory prices, of Erastus Corning & Co., Albany; Hart & Merritt, New York; J. H. Whitney, do.; E. J. Etting, Philadelphia; Wm. E. Coffin & Co., Boston. ja45

PATENT RAILROAD, SHIP AND BOAT Spikes. The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years' successful operation, and now almost universal use in the United States (as well as England, where the subscriber obtained a patent) are found superior to any ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to holes in iron rails, to any amount and on short notice. Almost all the railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

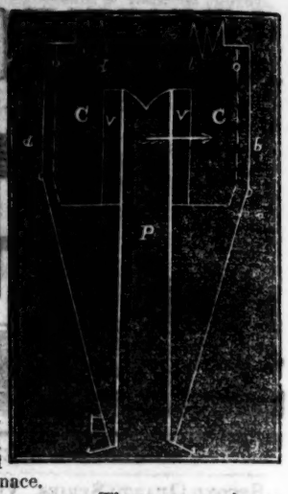
All orders directed to the Agent, Troy, N. York, will be punctually attended to.

HENRY BURDEN, *Agent.*

Spikes are kept for sale, at Factory Prices, by I. & J. Townsend, Albany, and the principal Iron merchants in Albany and Troy; J. I. Brower, 222 Water St., New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

*** Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufcturing so as to keep pace with the daily increasing demand. ja45

FRENCH AND BAIRD'S PATENT SPARK ARRESTER.



TO THOSE INTERESTED IN Railroads, Railroad Directors and Managers are respectfully invited to examine an improved SPARK ARRESTER, recently patented by the undersigned.

Our improved Spark Arresters have been extensively used during the last year on both passenger and freight engines, and have been brought to such a state of perfection that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.

These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase or obtain further information in regard to their merits:

E. A. Stevens, President Camden and Amboy Railroad Company; Richard Peters, Superintendant Georgia Railroad, Augusta, Ga.; G. A. Nicolls, Superintendant Philadelphia, Reading and Pottsville Railroad, Reading, Pa.; W. E. Morris, President Philadelphia, Germantown and Norristown Railroad Company, Philadelphia; E. B. Dudley, President W. and R. Railroad Company, Wilmington, N. C.; Col. James Gadsden, President S. C. and C. Railroad Company, Charleston, S. C.; W. C. Walker, Agent Vicksburgh and Jackson Railroad, Vicksburgh, Miss.; R. S. Van Rensselaer, Engineer and Sup't Hartford and New Haven Railroad; W. R. M'Kee, Sup't Lexington and Ohio Railroad, Lexington, Ky.; T. L. Smith, Sup't New Jersey Railroad Trans. Co.; J. Elliott, Sup't Motive Power Philadelphia and Wilmington Railroad, Wilmington, Del.; J. O. Sterns, Sup't Elizabethtown and Somerville Railroad; R. R. Cuyler, President Central Railroad Company, Savannah, Ga.; J. D. Gray, Sup't Macon Railroad, Macon, Ga.; J. H. Cleveland, Sup't Southern Railroad, Monroe, Mich.; M. F. Chittenden, Sup't M. P. Central Railroad, Detroit, Mich.; G. B. Fisk, President Long Island Railroad, Brooklyn.

Orders for these Chimneys and Arresters, addressed to the subscribers, or to Messrs. Baldwin & Whitney, of this city, will be promptly executed. FRENCH & BAIRD.

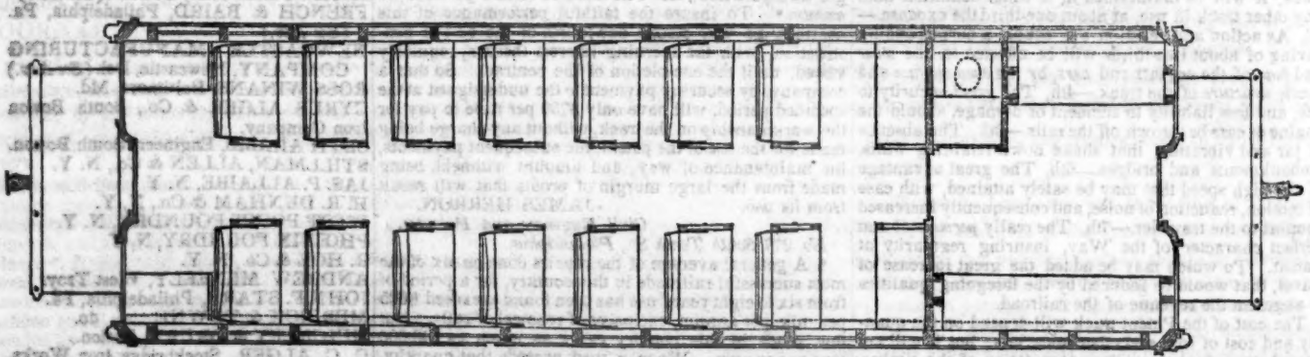
N. B.—The subscribers will dispose of single rights, or rights for one or more States, on reasonable terms. *Philadelphia, Pa., April* 6, 1844.

*** The letters in the figures refer to the article given in the *Journal* of June, 1844. ja45

BENTLEY'S PATENT TUBULAR STEAM BOILER. The above named Boiler is similar in principle to the Locomotive boilers in use on our Railroads. This particular method was invented by Charles W. Bentley, of Baltimore, Md., who has obtained a patent for the same from the Patent Office of the United States, under date of September 1st, 1843—and they are now already in successful operation in several of our larger Hotels and Public Institutions, Colleges, Alms Houses, Hospitals and Prisons, for cooking, washing, etc.; for Bath houses, Hatters, Silk, Cotton and Woollen Dyers, Morocco dressers, Soap boilers, Tallow chandlers, Pork butchers, Glue makers, Sugar refiners, Farmers, Distillers, Cotton and Woollen mills, Warming Buildings, and for Propelling Power, etc., etc.; and thus far have given the most entire satisfaction, may be had of D. K. MINOR, 23 Chambers st. New York.

The article is complete in itself, occupies but little space, is perfectly portable, and requires no brick work, not even to stand upon. It is valuable not only in the saving of time and labor, but in the economy of fuel, as it has been ascertained by accurate measurement, that the saving in that article is fully two-thirds over other methods heretofore in use. They are now for the first time introduced into New York and Boston by the subscriber, who has the exclusive right for the New England states, New York and New Jersey, and are manufactured by CURTIS & RANDALL, Boston; and by FORCE, GREEN & CO. New York.

DAVENPORT & BRIDGES' CAR WORKS.



DAVENPORT & BRIDGES CONTINUE TO MANUFACTURE TO ORDER, AT THEIR WORKS, IN CAMBRIDGEPORT, MASS. Passenger and Freight Cars of every description, and of the most improved pattern. They lso furnish Snow Ploughs and Chilled Wheels of any pattern, and size. Forged Axles, Springs, Boxes and Bolts for Cars at the lowest prices. All order punctually executed and forwarded to any part of the country.

Our Works are within fifteen minutes ride from State street, Boston—coaches pass every fifteen minutes.

RAILROAD IRON AND LOCOMOTIVE Tyres imported to order and constantly on hand by
A. & G. RALSTON
Mar. 20tf 4 South Front St., Philadelphia.

THE NEWCASTLE MANUFACTURING Company continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack screws, Wrought iron work and Brass and Iron castings, of all kinds connected with Steamboats, Railroads, etc.; Mill Gearing of every description; Cast wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.

The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention.
ANDREW C. GRAY,
j845 President of the Newcastle Manuf. Co.

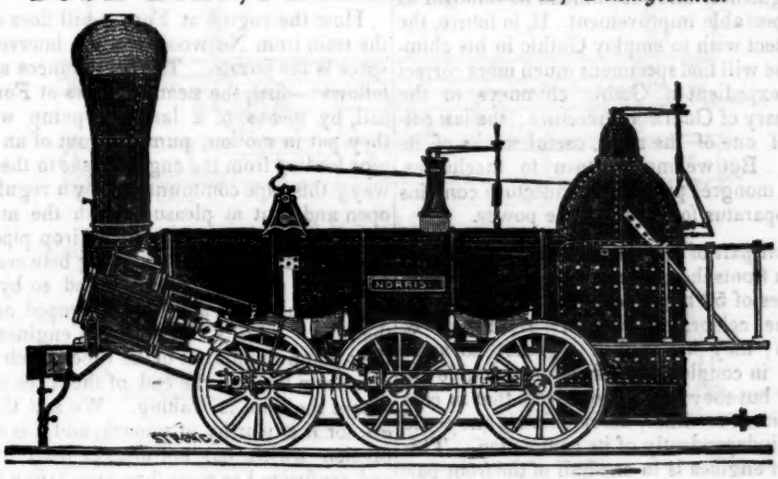
CUSHMAN'S COMPOUND IRON RAILS. etc. The Subscriber having made important improvements in the construction of rails, mode of guarding against accidents from insecure joints, etc. —respectfully offers to dispose of Company, State Rights, etc., under the privileges of *letters patent* to Railroad Companies, Iron Founders, and others interested in the works to which the same relate. Companies reconstructing their tracks now have an opportunity of *improving* their roads on terms very advantageous to the varied interests connected with their construction and operation; roads having in use flat bar rails are particularly interested, as such are permanently available by the plan.

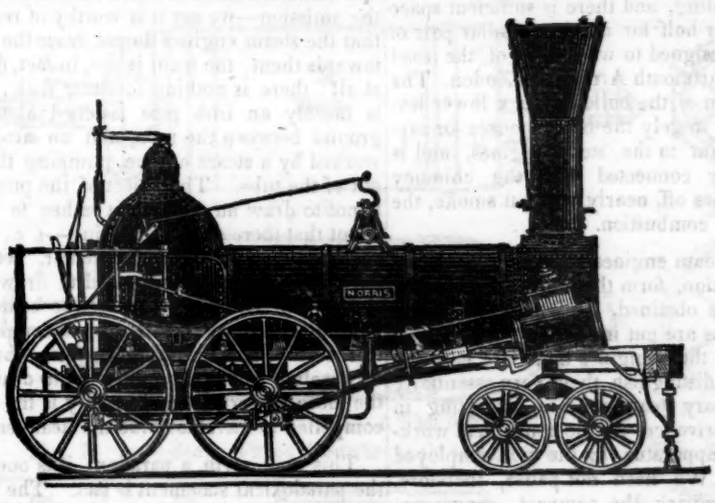
W. Mc. C. CUSHMAN, *Civil Engineer*,
Albany, N. Y.

Mr. C. also announces that Railroads, and other works pertaining to the profession, may be constructed under his advice or personal supervision. Applicaitons must be post paid.

NORRIS' LOCOMOTIVE WORKS.

BUSH HILL, PHILADELPHIA, Pennsylvania.





MANUFACTURE their Patent 6 Wheel Combined and 8 Wheel Locomotives of the following descriptions, viz:

Class	1,	15	inches	Diameter of	Cylinder,	× 20	inches	Stroke.
"	2,	14	"	"	"	× 24	"	"
"	3,	14½	"	"	"	× 20	"	"
"	4,	12½	"	"	"	× 20	"	"
"	5,	11½	"	"	"	× 20	"	"
"	6,	10½	"	"	"	× 18	"	"

With Wheels of any dimensions, with their Patent Arrangement for Variable Expansion.

Castings of all kinds made to order: and they call attention to their Chilled Wheels for the Trucks of Locomotives, Tenders and Cars.

NORRIS, BROTHERS.

TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.

PASCAL IRON WORKS.

WELDED WROUGHT IRON TUBES

From 4 inches to ¼ in calibre and 2 to 12 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T's, L's, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER Flues.

Manufactured and for sale by
MORRIS, TASKER & MORRIS.
Warehouse S. E. Corner of Third & Walnut Streets,
PHILADELPHIA.

RAILROAD IRON.—THE MARYLAND AND NEW YORK IRON AND Coal Company are now prepared to make contracts for Rails of all kinds. Address the Subscriber, at Jennon's Run, Alleghany County, Maryland.
WILLIAM YOUNG,
jy451m President.

TO IRON MASTERS.—FOR SALE.—MILL SITES in the immediate neighborhood of *Bituminous Coal* and *Iron Ore*, of the first quality, at Ralston, Lyoming Co., Pa. This is the nearest point to tide water where such coal and ore are found together, and the communication is complete with Philadelphia and Baltimore by canals and railways. The interest on the cost of water power and lot is all that will be required for many years the coal will not cost more than $1 to $1 25 at the mill sites, without any trouble on the part of the manufacturer; rich iron ore may be laid down still more cheaply at the works; and, taken together these sites offer remarkable advantages to practical manufacturers with small capital. For pamphlets, descriptive of the property, and further information, apply to Archibald McIntyre, Albany, to Archibald Robertson, Philadelphia, or to the undersigned, at No. 23 Chambers street, New York, where may be seen specimens of the coal and ore.
W. R. CASEY, *Civil Engineer*,

VALUABLE PROPERTY ON THE MILL Dam For Sale. A lot of land on Gravelly Point, so called, on the Mill Dam, in Roxbury, fronting on and east of Parker street, containing 68,497 square feet, with the following buildings thereon standing.

Main brick building, 120 feet long, by 46 ft wide, two stories high. A machine shop, 47x43 feet, with large engine, face, screw, and other lathes, suitable to do any kind of work.

Pattern shop, 35x32 feet, with lathes, work benches, &c.

Work shop, 86x35 feet, on the same floor with the pattern shop.

Forge shop, 118 feet long by 44 feet wide on the ground floor, with two large water wheels, each 16 feet long, 9 ft diameter, with all the gearing, shafts, drums, pulleys, &c., large and small trip hammers, furnaces, forges, rolling mill, with large balance wheel and a large blowing apparatus for the foundry.

Foundry, at end of main brick building, 60x45½ feet two stories high, with a shed part 45½x20 feet, containing a large air furnace, cupola, crane and corn oven.

Store house—a range of buildings for storage, etc., 200 feet long by 20 wide.

Locomotive shop, adjoining main building, fronting on Parker street, 54x25 feet.

Also—A lot of land on the canal, west side of Parker st., containing 6000 feet, with the following buildings thereon standing:

Boiler house 50 feet long by 30 feet wide, two stories.

Blacksmith shop, 49 feet long by 20 feet wide.

For terms, apply to HENRY ANDREWS, 48 State st., or to CURTIS, LEAVENS & CO., 106 State st., Boston, or to A. & G. RALSTON & Co. Philadelphia. ja45

CYRUS ALGER & CO., South Boston Iron Company.

Atmospheric Railway.

[Continuation of Clegg and Samuda's plan.]

For a description of the *piston* and *heater* carriages or A and B, see last number, page 45.

We announced in our last the public opening of the Croydon atmospheric railway, and laid before our readers a general view of the circumstances in which the undertaking originated and has been carried out. We have seen that this line is the production of the combined talent and enterprize of a considerable number of men, to each of whom we were desirous that the public should assign the due share of merit. There are also several other men of talent whose invention has been laid under contribution to carry out this undertaking, whose respective works we shall take an early opportunity of specifying; but we were anxious that our readers should not be troubled in the outset of their examination of this interesting subject with too much variety of detail.

We now proceed from the general view of the enterprize to examine some of the details by which it has been carried out. For this purpose it may be convenient to our readers to divide the subject in their own minds much in the manner in which we shall consider it. For this purpose we advise that the examination should be undertaken by our readers in the same order in which we recommend that it should be conducted on the spot by those who have an opportunity of visiting the railway for themselves; and we believe that the Croydon railway company will be found ready to afford all the readers of the *Railway Chronicle* early and ample opportunity to visit the line; at least, we are sure that a written application to Mr. Young, the secretary, for this purpose, will receive attention at the earliest moment the interests of the undertaking will admit.

We recommend, therefore, that the readers of the *Railway Chronicle*, and the visitors of the Croydon atmospheric railway, should examine and consider, apart from each other, as perfectly independent subjects, the following:—

(1.) The *genesis* of the power, or the apparatus by which the motive force is created.

(2.) The *transmission* of the power, or the means by which the force produced at one end of the line is made to act at the distance of three miles.

(3.) The *application* of the power, or the means by which it is made to act on the train, so as to bring it under the control and management of the attendants.

1. *The Genesis of the Power.*—The first object which attracts the notice of the observer, is also that which he should first examine. It lies in the highly decorated building of which a picturesque view was given in our last. On arriving at the Dartmouth Arms station of the London and Croydon railway, our readers will notice on the same side of the line on which he gets out of the Croydon carriage, a sort of Gotho-elizabethan-cottage ecclesiastical style. A high, slender tower, battlemented in the Tudor style, is the mask for a steam engine chimney, and would have been tolerably perfect for this purpose had the ambition of the architect allowed him to stop short at a handsome chimney. But he aimed too high, and has fallen short of his aim. He determined that his chimney should be mistaken for something else. Where the chimney should have ended he has commenced a Gothic church-spire or pinnacle! through the perforated decorations of which escaped the vile smoke and steam. The result is bad—it puzzles the eye—it neither entertains nor pleases it. The cheat is soon discovered, for the smoke has already discolored the would-be aspiring pinnacle, and it looks like a dirty extinguisher on the top of a tallow candle. Perhaps, however, the architect was assured that the chimney was to be *smokeless;* so it is, when the fire is well lighted, but when that is in embryo, and in certain states of the weather, it smokes and soils the decoration. We disapprove of the extinguisher, and recommend its removal as a respectable improvement. If, in future, the architect wish to employ Gothic in his chimney, he will find specimens much more correct and expedient of Gothic chimneys in the Glossary of Gothic architecture; the last edition of one of the most useful works of its class. But we must return to mechanics. This mongrel piece of architecture contains he apparatus for creating the power.

That part of the atmospheric engine-house which fronts the road contains a pair of steam engines of 50 horse power each, constructed by the celebrated firm of Maudslay & Field; they are united together so as to work in couples, and form one double engine; but they are so contrived that in case of accident to either, the remaining one could work independently of its companion. This pair of engines is in one-half of the front part of the building, and there is sufficient space in the other half for another similar pair of engines, designed to work part of the road between Dartmouth Arms and London. The back portion of the building on a lower level, contains merely the boiler houses for supplying steam to the steam engines, and is immediately connected with the chimney which carries off, nearly without smoke, the products of combustion.

These steam engines of about the ordinary construction, form the source from which the power is obtained, by which the atmospheric trains are put in motion. In the construction of these engines there are no great features to distinguish them very essentially from ordinary steam engines, excepting in certain contrivances for the convenient working of the apparatus by the men employed in its use. We need not pause, therefore, longer to remark the compact, convenient and economical arrangements which characterise all the engines of the celebrated makers.

So much for the source of power; it is a pair of ordinary steam engines of 50 horse power each. But it might be obtained in many other ways. A hundred horses drawing round a wheel could do the same work, or the power of water falling on a mill-wheel might set agoing the same machinery. The source of the power is indifferent to the effect, except as a matter of economy. Only in our present case it happens to be derived from the steam engines contained in the highly decorated buildings we have already noticed. The visitor need puzzle himself no longer on this part of the subject.

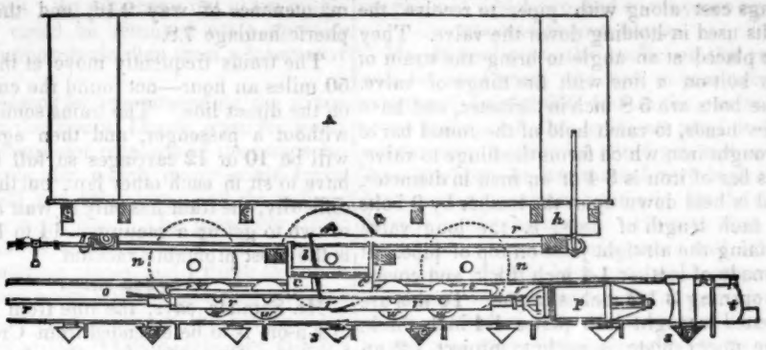
2. *The Transmission of the Power.*—This second point is more worthy of careful attention. How, does the steam engine, which is at one end of the railway, draw along towards itself a weight of 50 tons which is at 3 miles distance from it? for this is the distance of one engine and engine-house from its next neighbor: The first engine is at Dartmouth Arms, Forrest-hill station, and the second is at Norwood station, three miles farther on.—From Norwood to Forrest-hill the train is to be brought along by means of an engine at the latter.

How the engine at Forrest-hill does draw the train from Norwood over the intervening space is the puzzle. The contrivances are as follows:—first, the steam engines at Forrest-hill, by means of a large air-pump which they put in motion, pump air out of an iron pipe leading from the engine-hosue to the railway; this pipe communicates by a regulator, open and shut at pleasure, with the atmospheric tube, which is merely an iron pipe, 15 inches in diameter, lying along between the rails of an ordinary railway, and so by the aforesaid pipe, the air is also pumped out of the tube. This is all the steam engines do: they pump the air out of the tube which reaches from them to the end of the three miles where the train is waiting. We say this is *all*, for it is worthy of remark, and it is a distinction which has not always been made, and confusion has more than once arisen from the omission—we say it is worthy of remark, that the steam engines do not *draw* the train towards them: the train is not, in fact, drawn at all; there is nothing to draw with: there is merely an iron pipe fastened along the ground between the rails, and an air-pump worked by a steam engine, pumping the air out of the tube. The object of the pumping is not to draw anything, but rather to bring about that there shall be nothing—*i. e., a vacuum*, void space—and no matter, between the engine, which is supposed to draw, and the train of carriages supposed to be drawn. And the result is, that the more completely this is done, and the more perfectly there is an absolute void and nothing left to draw by, the more powerfully and rapidly is the train compelled to travel towards the steam engine.

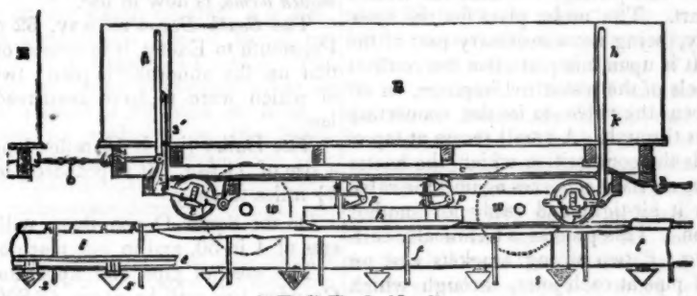
This may seem a paradox: it is one, but the paradoxical statement is fact. The train, therefore, is not drawn by the engine, towards which it travels. The result is a mere philosophical deduction, and it is the remoteness of this deduction which gives to this invention its scientific beauty. The steam engine does *not draw* the train—does not, indeed, cause its motion, except indirectly. It merely prepares the way for the motion of the train, by removing out of the tube air which would impede its progress. The atmosphere behind *pushes* forward the train,

ELEVATION OF ATMOSPHERIC TRAIN.

THE PISTON CARRIAGE.

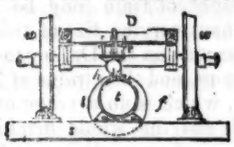


THE HEATER AND SOLDERING CARRIAGE.

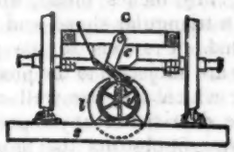


SECTIONS.

End View Heater Carriage.



End View Piston Carriage.

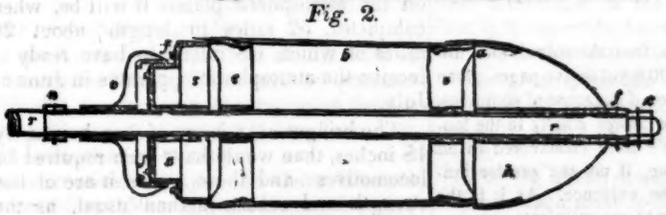


THE PISTON.

Fig. 1. Scale Three Fourths Inch to one Foot. *Fig.* 3.

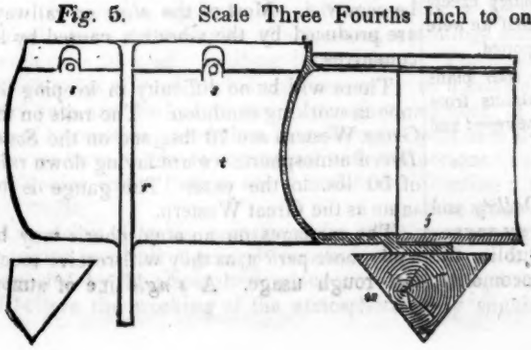
Fig. 2.

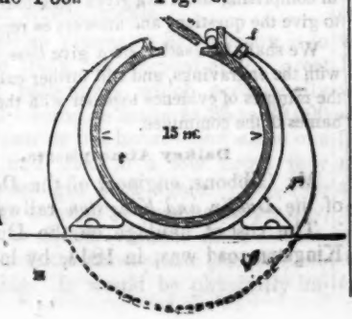
Fig. 4.



THE VALVE AND ATMOSPHERIC TUBE.

Fig. 5. Scale Three Fourths Inch to one Foot. *Fig.* 6.





which is thus driven by a *vis a tergo* towards the steam engine. If the atmosphere were suddenly lightened the train would move less rapidly. We have heard of railways to the Moon! but an atmospheric railway to that quarter, or in it, is impossible: it has no atmosphere. When we get there, the fixed engine, the rope, the locomotive, may answer, but not the atmospheric, for the Moon has no sensible atmosphere.

The engines, then, merely make a vacuum before the carriages. After they have done this they have nothing more to accomplish; this once done perfectly, they might stop altogether, yet nevertheless, if the vacuous space they had made in the pipe remained empty, the train, if allowed to start, would go forward, and would arrive at its journey's end just as well as if they were working. The engines merely clear the way—they make a void before the train, and on an opening being made by which the atmosphere may enter, it rushes with great force into the vacuum, carrying before it any obstacle that stands in its way: precisely such an obstacle is placed in its way—it is called THE PISTON, and the atmosphere pushes this obstacle along with so much force that a train of carriages being firmly attached to this piston, is pushed along with it to the other end of the three miles, or as far as it can pass without encountering resistance of air or other obstacle.

The piston and train is therefore pushed from behind, not drawn from before; and it is pushed, not by a steam engine, which merely clears the way, but by the weight or pressure of our atmosphere rushing into a vacuum. The great advantage which the atmospheric system may obtain in point of speed is due to this, chiefly, that the speed of the atmosphere rushing into a vacuum is 800 miles an hour. If therefore we can make a vacuum sufficiently well, there are no moderate limits to the speed to be attained, except for safety and economy.

The vehicle for transmitting power from the steam engine to the train is therefore *void space*. The creation of this void is thus the *indirect* cause of motion in the train. The direct cause is the weight of the atmosphere pressing air in behind the piston with a velocity of 800 miles an hour. The piston is merely the obstacle which is interposed between the vacuum and the air rushing in behind it, and the piston with the train attached to it are the obstacles which prevent the attainment of this velocity. The force acting at one end merely brings into play therefore a force residing permanently at the other, viz. the pressure of the atmosphere: the stem engine merely opens the way for it, by pumping out the air, and so making a void for its reception.

3. *The Application of the Power.*—This has brought us to our last topic, viz. the manner in which this power (the pressure of the atmosphere) is conveniently applied to the propulsion of a railway train. The mechanism by which this is accomplished consists chiefly of two parts, the PISTON and the LONG VALVE, each of which has several ap-

pendages. We shall describe them separately: the piston is, as we have said, the obstacle placed in the atmospheric pipe, which the atmosphere has to push forward before it. The valve is the means by which an opennig is made at every successive point along the whole tube, allowing the atmosphere to enter behind the piston without admitting it before, and through this same opening passes the bar of iron, which is carried from the piston to the train, and by which carries the train along with it.

Fig. 1, is an elevation of piston and valve complete.

Fig. 2, a section through the centre, showing the valve partly open.

Fig. 3, end view of valve.

Fig. 4, end view of piston. *t*, a brass tube upon which the whole of the piston, ect. is fitted, by which means it can readily be withdrawn and another substituted. *e e*, two brass cylinders or end pieces, revolving loosely on the tube *t*. To those end pieces is rivetted a wrought-iron barrel, *b*, forming altogether the main body of the piston. *v*, the piston valve, made of brass. It is on the principle of double beat, to facilitate its action. *s s*, the valve seat, also of brass. It is through this valve seat that the air rushes when the valve is drawn open (as in fig. 2). *f f* are two rings of leather, forming the tight joints to the valve when shut (as in fig. 1). A ring of iron and a number of small bolts keep the leather rings from shifting. *n n*, screw nuts fixed on tube *t*, to limit the travel of the valve *v*. *o*, the iron rod attached to valve, and leading to connections under the command of the conductor. *p*, a guide pin fixed into valve seat to prevent the valve turning round, so as to strain the rod *o*. *h*, a brass end piece, forming a collar to piston. *a a*, diaphragms or cups of leather, inserted at each end of the barrel. These diaphragms of leather form the tight packing between the piston and the pipe, in the same manner as metal or hemp packings do in air-pumps or steam cylinders. *j*, screw nuts on end of tube, for the purpose of jamming the parts of the piston together, and thereby retaining the leather packing in position. By such an arrangement a fresh packing can be inserted with great facility, without having to detach the whole piston. *r r*, the piston rod, accurately fitted to the tube *t*. *k*, screw nuts on end of piston rod, which secure the whole together. The pistons are all made exactly alike, so that in the event of anything giving way a fresh one can be attached without occasioning any delay. The diameter of the piston is 15 inches, being the same as the inside diameter of the pipe.

Fig. 5, side view of pipe, with a part in section showing how two are joined together.

Fig. 6, cross section of ditto, showing the manner of attaching the long leather valve. *t t*, a cast-iron pipe, 15 inches in diameter, 3-4 inch thick, and made in separate lengths of 10 feet; *r r*, strong rib, 1½ inchs. thick, and increasing in depth from 1 3-4 inch at top to 7 inches at bottom; there are three such ribs in each length of pipe; *j*, the joint, 4 1-2 inches long, and accurately fitted to one another; into the recess is introduced a quantity of rope yarn and composition, and driven hard up, forming an air-tight joint; *s s*, snags cast along with pipe, to receive the bolts used in holding down the valve. They are placed at an angle to bring the strain of the bolt on a line with the hinge of valve. The bolts are 5-8 inch in diameter, and have claw heads, to catch hold of the round bar of wrought iron which forms the hinge to valve; this bar of iron is 3-4 of an inch in diameter, and is held down upon the leather by 9 bolts in each length of pipe; *v*, the long valve forming the air-tight joint on top of pipe. It is made of leather 1-4 inch thick, and covers an opening 3 1-2 inches broad. To this are rivetted wrought iron plates 1-4 inch thick. The upper plate is made to project 1-2 an inch over the opening, to stiffen the leather at that part. The under plate fits the opening easily, being not a necessary part of the valve. It is upon this plate that the coulters and wheels of the piston rod impinge, in order to open the valve to let the connecting plate pass through. A small recess at top of pipe holds the composition which the heater attached to carriage squeezes against the valve to render it air-tight and ready for another exhaustion. This process is technically called sealing; *f*, two strong brackets cast on bottom of pipe at each joint, through which pass two 3-4 in bolts, to hold it down to the wooden sleeper; *w w*, wooden sleeper, 9 feet long, 11½ inches broad, and 7 inches deep, of a triangular shape and bedded into the ground. Previous to the pipes being used they are subjected to the process of proving, after which they are well cleaned and the inside deprived of any asperities of surface that might obstruct the progress of the piston. The inside is then coated over with hard tallow, which serves the double purpose of facilitating the motion of the piston, and luting the leather packing.

Figs. 7 & 8 show the atmospheric pipe, *in situ*, below the carriage, and the valve and piston in their places, as in action.

SELECT COMMITTEE OF THE HOUSE OF COMMONS—ATMOSPHERIC RAILWAY—MINUTES OF EVIDENCE—MESSRS. BRUNEL, VIGNOLES, LOCKE, CUBITT, GIBBONS AND SAMUDA.

The following extracts, from the volumnious minutes of evidence over 190 royal octavo pages, given before the select committee of the house of commons, are made nearly, but *not always* wholly in the language of the report. We have endeavored in *all* cases, to give the *meaning*, if not the precise language of those giving the evidence. As it is the truth we seek, and desire to communicate, we can have no object in alterations of phraseology except in comprising more in a given space than if we were to give the questions and answers as reported.

We shall, in *another extra* give *three other* plans with the engravings, and still further extracts from the minutes of evidence together with the *report* and names of the committee.

Dalkey Atmospheric.

Mr. Gibbons, engineer of the *Dalkey* and of the *Dublin and Kingston* railway says—The cost of haulage on the Dublin and Kingston road was, in 1844, by locomotive, 11d, and the maintenance of way 3 3-10d—and by Atmospheric 7.1d per mile—in 1845 the Locomotive haulage cost 9-45d—the maintenance of way 2.1d, and the Amospheric haulage 7.8.

The trains frequently move at the rate of 50 miles an hour—not round the curves, but on the direct line. The trains sometimes go without a passenger, and then again there will be 10 or 12 carriages so full that they have to sit in each other lap; but there is no difficulty, the train has only to wait a minute or two to get up a vacuum. 14 to 16 inches is the most profitable vacuum.

Croydon Line.

Mr. Samuda says, the line from Croydon to Epsom is to be extended from Croydon to London. Five miles, from Croydon to *Dartmouth arms*, is now in use.

The *South Devon* railway, 52 miles from Plymouth to Exeter, is in course of construction on the atmospheric plan; twenty miles of which were to have been ready in July last.

The Dalky line is 1¾ miles long, and has a rise of 71 feet. It is proposed to extend it 5¼ miles to Bray.

On the South Devon there will be gradients of 1 in 50, and in one place of 1 in 42.

The cost of pipe and apparatus for the Croydon line will be about £3,800 per mile—the estimate was £4,000.

The weight of train may be materially varied, without varying size of tube. It is a common practice on the Dalkey to run trains of only 16 tons. and then trains of 75 tons up the incline, which is an average of 1 in 115.

The rails and the whole machinery may be kept in perfect condition, and in consequence the travelling may be made more *regular*, more *rapid*, and *much safer*.

The economy of stationary power will be greatly promoted by the frequency of the trains, yet wherever the traffic is sufficient to justify the construction of a railroad, stationary engines will be cheaper than the locomotive.

Mr. Brunel said: I am engaged in constructing the *Exeter and Plymouth* railway, on the atmospheric plan. It will be, when completed, 52 miles in length; about 20 miles of which we intend to have ready to receive the atmospheric apparatus in June or July.

The bridges *over* it are of less height, by 18 inches, than would have been required for locomotives: and those *under* it are of less strength and substance than usual, as the weight and *vibration* of the locomotives will be removed. Most of the *slips* on railways are produced by the vibration caused by locomotives.

There will be no difficulty in keeping the tube in working condition. The rails on the Great Western are 70 lbs., and on the *South Devon* atmospheric we are laying down rails of 50 lbs. to the yard. The gauge is the same as the Great Western.

The carriages on an atmospheric may be made more perfect, as they will receive much less rough usage. A *single* line of atmos-

pheric, will, upon the whole, be liable to less interruption, than a *double* line worked by locomotives. In *nine* cases out of ten an obstruction could be removed more speedily from an atmospheric than from a locomotive line.

The reasons for recommending the atmospheric on the South Devon were the gradients; the superior comforts of the atmospheric principle, by which many would travel who would not otherwise; and the reduced cost of a single line. The passenger traffic on this line will be very great. Persons going to watering places, and I think the number of passengers will be materially affected by the superior comforts of the atmospheric.

On the Great Western, full *five* minutes are lost by stopping at a station, in *addition* to the time during which the train is at rest; but on an atmospheric line it would not amount to over *a minute and a-half.* The whole line from Exeter to Plymouth may be traversed at a speed of 60 miles an hour

There are no gradients on the South Devon, upon which even locomotives may not descend with safety, therefore I apprehend no danger to the atmospheric, as we have less weight to draw.

The steepest gradients upon a locomotive line, that I recollect, are upon the Birmingham and Gloucester, 1 in 35.

I think, in a line like the South Devon, where we propose to run 6, 8 or 10 trains a day, we can draw those trains much more cheaply, by stationary power on the atmospheric principle, than we could by locomotives.

The more *frequent* the trains, the more appropriate is the atmospheric system.

I think a single line of atmospheric on the South Devon will be sufficient for its traffic, even if it should be as great as that upon the London and Birmingham. On inclined planes there will be double lines of rails—as the descending train may run down *without* tube. This will give facilities for meeting trains to pass each other.

The Exeter and Plymouth line was originally laid out for a locomotive line. It has gradients of 1 in 40. Assistant power was to be used on these grades.

The South Devon line is a continuation of a locomotive line. There will be no more difficulty in changing the carriages from a locomotive to an atmospheric line, than from one locomotive to another.

Locomotives run upon the Great Western railroad from 150 to 200 miles each day they are at work; upon the average, about 150 miles. There are upon the Great Western railroad about three-fourths of a locomotive to each mile of road; or about 150 engines for 250 miles of road, including *branches.*—*Short* lines are worked to much less advantage of locomotive power, than long lines, because we have to run to correspond with the *main trains*, rather than to accommodate the local traffic.

The delay of trains, occasioned by what the engine men call "*greasy*" weather, will be avoided by the atmospheric plan.

I believe the working of the atmospheric railway will be as much *superior* to the working of a locomotive line, as *that* is to our old rough lines which we had some years ago.

Blackburn and Bolton.

Mr. Brunel says, the traffic on this road will be very great, and has to pass over a summit of nearly 600 feet in the course of seven miles, and the gradients are 1 in 70, which were the best he could get, and with these gradients he has several very high viaducts, and an enormous tunnel; yet the traffic will justify the outlay. He says that he has no doubt but that the directors will, when the atmospheric has been proved, be prepared to listen to his suggestions for a *single atmospheric*, instead of a *double* locomotive line.

Exeter and Plymouth Line, or South Devon,

Is to be 52 miles long, a single track, and about 20 miles are expected to be ready in July to receive the atmospheric apparatus.

The last rails on the *Great Western* are 70 lbs. per yard. Those I am making for the *South Devon* are 50 lbs., and I should say that, for the work they have to do, they are stronger and will last longer than the 70 lbs., on the locomotive line. I propose to introduce a greater degree of perfection into the wheels and springs of the carriages on the South Devon than on the Great Western As they will be subject to much less violent usage, therefore we can make more perfect carriages.

We have gradients of 1 in 40 and 1 in 50, for nine or ten miles; but the speed will not be much retarded by them. Expect to send trains over them at 40 miles an hour.

Mr. Vignoles recommended the adoption of the atmospheric for the Dalkey, and also from Dalkey to Bray (5¼ miles). Also from *Vienna* to Schonbrunn. On this line the gradients vary from a level to 1 in 30—the length is about seven miles.

I am not prepared to recommend it indiscriminately, but am quite prepared to say that under *most* circumstances, the atmospheric would be preferable to the locomotive.

I consider it perfectly applicable to long lines. We only need *experience* to teach us in what particular manner we are to overcome difficulties in the mode of working. That is, to ascertain the CHEAPEST mode, which can only be ascertained by experiene.

The great principle of the atmospheric system is the substitution of an economical stationary power for an expensive locomotive power.

In laying out an atmospheric line I should conform much more to the natural surface of the country than in a locomotive line; taking that as a general rule, so as to diminish the cuttings and embankments.

The line from Vienna to Schonbrunn is to be a double track, on account of the great number of passengers which occasionally pass over it—being as many as 25 to 30,000 persons in four or five hours—and *all* in one direction; and then in a few hours they must all be brought back again. The ordinary average number of passengers per day, is about 2 to 3,000. Under these circumstances, I think the atmospheric plan particularly suitable. It would be physically impossible to carry that number of persons by locomotives. The number of locomotives required to take so many passengers, trains leaving every five minutes, with a vast number of carriages, would create so much confusion as to render it perfectly impossible to do it. With the atmospheric system it would be a continual succession of carriages as fast as the exhaustion of the pipe could be completed between the stations; and without any backing or returning of the locomotives.—The trains would continually oscillate.

I know of no other line than the one from Vienna, where the atmospheric is to be used with gradients of 1 in 30; on the South Devon there are gradients of 1 in 40; and I have recommended the adoption of gradients 1 in 30 upon the railway now about to be laid down from Paris up to St. Germain's. I strongly recommended a 1 in 30 gradient for the last mile, with a lofty viaduct across the Seine. This road is to be worked by the atmospheric system.

In almost all cases I think the expense of construction of a single line of atmospheric will be less than that of a double locomotive line, *including* the engines and other matters connected with them. I have no tables here to sustain this opinion, and then the present price of iron is so high, that it would probably affect the question in some degree; but a double locomotive railway, with *seventy-five* lbs. per yard rails—*which are now considered the best* for locomotive lines—with proportionate size chairs, and the expense will vary from £5,000 to £6,000 a mile, according to the price of iron. Rails of this weight, and even of 78 lbs. per yard are used on the Midland Counties.

On the North Union railway, 22 miles long, we have about 12 passenger engines—but this road being worked in connection with the Liverpool and Manchester, the engines and traffic are a good deal mixed up, and the colliers furnish their own engines, which makes it difficult to say how many engines are necessary; but "an engine a mile" is a common saying. On roads the length of the Great Western, there are probably not as many required; but on the Birmingham I should say an engine a mile is required. On lines of 40 miles, or thereabouts, where few trains are run, the number required will not be as great.

There are probably 60 trains that come in and go out of Preston daily; and nearly 100 that go through the station or past it.

I am quite satisfied that a single line of atmospheric will do as much business as a double line of locomotive railway. I have studied the system from the time the model was first exhibited in Paris—ten years ago. I was daily at Wormwood Scrubbs, and have watched the progress of the system with great interest; and I think I may venture to say that I was the first engineer who recommended its adoption at all in a practical way, and the result has every day confirmed the impression then made upon my mind. You may send off trains with more frequency, with greater economy, and may get *rapid trains with perfect safety.*

I will state the reasons why, in one particular instance, I think the atmospheric will be laid down instead of the locomotive, even though our estimates have been made for a double line on the locomotive plan. I refer particularly to the "Blackburn and Bolton." The traffic on this line is very great indeed, and it has to pass over a summit of nearly 600 feet in the course of seven miles. The gradients laid down are 1 in 70, and I can get nothing better, and even with these grades, I have an enormous tunnel and several viaducts of very great height; but still the traffic is such as to justify the construction of it, and the board of trade have approved of the line. The question has not been raised how the line is to be worked, but *I have no doubt* that, when the atmospheric comes to be tried and proved. (and it requires, in order to convince the public mind, to be tried somewhere on a sufficiently large scale,) the directors of that company will be prepared to listen to my suggestion for a *single* atmospheric, instead of a double locomotive line. The length of this line is 13 miles, and I am quite sure that if the work had been [done with a view to a single atmospheric, instead of a double locomotive, I could have saved £50,000 in earthwork and so forth.

I have the Waterford and Limerick line under my charge, and if it were left to me, I should adopt the atmospheric plan for the following, among other reasons, viz: in an agricultural country like Waterford and Limerick, the benefit of railroads will not be felt fully, unless you give the utmost possible accommodation, on the lowest possible terms, in order that you may be able to transport the only thing that the country affords, viz: agricultural produce, on such terms as to induce the people to send their produce to an extent which they do not do at present; and I think that I should be able to do that with *stationary* engines, because I should be able to employ those engines when not in use for the railway, to advantage, in grinding corn, etc., instead of sending it to Manchester to be ground.

I have had a great deal of experience in working locomotive engines, and in the working of railways; and unless some very material improvements were to occur, I should put the expense of working the atmospheric line, properly mounted with good materials to start with, at *half* that of the locomotive.

The Dalkey line is not a fair test, because it is under such unfavorable circumstances. The present cost of working that is, I think, 7d. per mile. When it comes to be in proper work, it will not exceed 5d., if even so much as that; and when the traffic increases it may be done for less than 4½d.

The *average* quantity of fuel for locomotives is 20 lbs. of *coke* per mile per train.

Increased velocity can be attained, I believe, at much less expense with the atmospheric than with the locomotive. You can get under full motion, and come to a state of rest in a much shorter time, and the cost of producing the velocity is much less.

One of the practical advantages of the atmospheric principle, is the freedom from accidents, or inconveniencs, by the road not being in a perfect state of repair. It was remarkable with the line at Wormwood Scrubbs, the extreme dilapidation into which it got; and yet the experiments never failed. I will mention one or two remarkable instances of that. It had been unattended to, and unvisited, for two or three months. It was a severe frost; and in the preceding rains the road had got greatly disarranged. I think there was a difference of level of one or two feet in some places in the rails, in the course of a few yards. The frost was in the ground and the pipe had water and ice in it. A distinguished nobleman arrived, and desired to see the railway on this frosty morning. A message was sent down, and the steam was got up; and when they came to work they found the pipe full of ice and water; which rushed out of the other end like a torrent.—Yet the next run was as good as I ever had. Then, at another time, the line was disarranged to a still greater degree—it was so bad that nobody dare go over it. I went over it myself, and I went at the utmost velocity, *without danger*. There was *no getting off the rail*, nor any dislocation. *It was these two experiments* which induced me to recommend, *in the strongest manner*, that the atmospheric principle should be adopted on the Dalkey line.

A locomotive engine could not have gone three miles an hour on a road in similar condition. The joints were not broken, but the pipe was like the back of a "*sea sarpent*," as we hear it described by the Americans. At one part the earth had slipped away, and there was no support at all under one of the rails; and when we went over them, at the rate of speed I have stated, an ordinary wagon, drawn by a horse, could not have travelled upon the rails three miles an hour safely.

Robert Stephenson, Esq., says, I entered into an investigation of the atmospheric principle at the request of the directors of the "Chester and Holyhead railroad." I proceeded, at the request of the directors of that road, to *Dalkey*, and there made such experiments as I thought proper, for the purpose of satisfying myself whether it would or would not be a proper mode of propulsion on the Chester and Holyhead line; and it was upon *these experiments* that I made my report to them. They did *not* adopt the system, because I stated it as my opinion that there would be no peculiar *economy* in the first construction, and that the *working* of the line would be more expensive.

There are *some* circumstances, as for instance, if the Blackwall railway had been between Blackwall and London alone, [that is without stopping places] the atmospheric would have been an extremely convenient mode of propulsion; but inasmuch as in those *three and a half* miles there are *five* stations, stoppage at which, upon the atmospheric system, would be essential—the *loss of time* would be so great for the accommodation of the intermediate traffic, that the long traffic would be entirely sacrificed.—The trains upon that line are exceedingly heavy. They run every quarter hour—each way, and sometimes we have 15 carriages weighing from 6 to 8 tons each; and if we had to pull up that weight five times in 3½ miles, it would entirely frustrate the object in view in applying the system to the Blackwall railway, viz: quick communication between the termini.

There are three kinds of power available for railway purposes, viz: stationary engines with ropes, which may be applied either to a hilly, or flat country; the locomotive system; and the atmospheric. I believe, in point of power, the cost of producing a certain amount of available power, I mean power *practically* available, is very much the same, with stationary engines you have the whole ofthe power communicated to the train, except what is absorbed by the engine itself, or by the friction of the rope.—In the locomotive system you have an objection arising from the engine itself, which is a ponderous machine, acting against you whenever you vary from a level. Then with the atmospheric you have the *leakage*—but no friction at all except that of the engine which is the same as in the common stationary engine, therefore the comparison between the atmospheric, and the stationary engine, is simply a comparison of the *rope* and the *leakage*. Yet it is difficult to compare them because the effect of the rope is constant. The leakage varies according to the pressure. At 2 or 3 inches vacuum it would be very immaterial. In my experiments at Dalkey it amounted to 250 feet per minute of course the power required to pump 250 feet per minute was the loss: then as you increase the vacuum will the loss increase. What I mean to say is that, as you increase the load in the atmospheric, or increase the necessity of working with a higher vacuum, you make the atmospheric worse than the rope; but as you decrease the vacuum you make it better than the rope. It appears that the friction of a mile of double rope is about equal to the leakage of a mile and a half of pipe. They appear to be as nearly as possible equal. I believe, however, that a large proportion of the leakage takes place in the pump, where there is a good deal of nice workmanship, and constant wear and tear is going on.

On the Dalkey, at a vacuum of 25 inches, the engine can do no more than absorb the leakage. It cannot take any load at all, at any velocity, because the expansion of the leakage is such that the pump can only draw it out—at its expanded bulk. I have no hesitation in saying that the results show that the longitudinal valve is *a complete triumph of mechanism*. I do not think any improvement can be made. It is lifted with the greatest possible ease, nor is there any difficulty in squeezing it down again. Indeed I consider the arrangement as perfect as any thing can be.

I compared the working of the Dalkey line, on the Atmospheric, with the working of the Euston plane, from Euston square to Camden Town, by means of a rope, and I found that the power lost by the rope in the one case, was as nearly as possible, equivalent to the loss by leakage in the other; the vacuum being from 16 to 18 inches, and the trains passing at 18 to 20 miles an hour. The rope on the Euston plane is an endless rope, and therefore 2 miles in length, and the friction of it equal to the leakage of 1¼ mile of pipe on the Dalkey. I think there is but little difference in the capability of the locomotive and atmospheric to attain and maintain a high velocity. I know of no instance where the velocity of the atmospheric, for any useful experiment, at all approached the utmost speed attained upon locomotive lines. I have gone 55 miles an hour on the Great Western, between Bath and Bristol; but I have never known of equal speed on the atmospheric. In all the experiments made by me upon the Dalkey line, with very light loads, a greater speed was attained upon that plane than could have been attained by a locomotive engine; but with heavy trains, a locomotive would have beaten the atmospheric upon that identical plane.

The trains I experimented with were from 27 to 64 tons, and there was one train of 70 tons.

Up a gradient of 1 in 115 a train of 64 to 70 tons will be moved more rapidly by locomotive than by atmospheric, because a vacuum of 22 to 24 inches will be required, and *then* it is that the *leakage* is so great that the velocity is reduced, and the locomotive will decidedly exceed the atmospheric. I have a table of the trains which varied from 27 to 64 tons. With light trains the locomotive would have been at fault, but with heavy trains it would have been better than the atmospheric.

I think the amount of load, where the locomotive begins to have the advantage, is about 50 tons; as the barometer indicates at that load about 20 to 21 inches vacuum; and *even* at *that* load, I am inclined to think the locomotive would have the advantage in speed.

[*Continued on page* 60.]

Correspondents will oblige us by sending in their communications by Tuesday morning at latest.

PRINCIPAL CONTENTS.

AMERICAN RAILROAD JOURNAL.

PUBLISHED BY D. K. MINOR, 23 Chambers street, N.Y.

Saturday, January 24, 1846.

Western Railroad and the Worcester.

The gross receipts for transportation on the Western railroad are reported to have been as follows, viz:

	1843.	1844.	1845.
Receipts	$573,882	$753,753	$810,000
Expenses	289,450	314,074	365,000
Net receipts	284,432	439,679	445,000

The cost of the Western railroad, 156 miles, was $7,686,202, of which $3,000,000 was raised by stock and the balance, $4,686,202 by loans; of course no dividend was made in 1843, as the interest at 6 per cent. absorbed the entire net earnings, into about $3,000: but in 1844 the net earnings increased to $439,679, which enabled them to make a dividend upon their stock of 3 per cent. after paying the interest on their loans, and have about $68,507 to carry to sinking fund; and for 1845 they will be able to pay the interest on their loans and about 5 per cent. on their stock and have $13,828 to carry to sinking fund from the *earnings*, in *addition* to the *interest, on* the sinking fund invested, which is stated at $26,041; and *also* in *addition* to a *claim* on the Worcester road of $30,000 for *excess* of charges during 8½ months since the award on 15th April last. From this statement it will be seen that the Western road is to become a good dividend paying stock, especially if its affairs are managed wisely. The *prospective* increase should greatly exceed the past, as the *branch* roads which are now fairly commenced will be to it what the small streams of a country are to its principal rivers. We may therefore look for a steady and constant increase of receipts and dividends upon this road.

Worcester Railroad.

The receipts of this road are said to have been during the year 1845, $504,458, and its expenses, $267,848. If this statement is correct, then the receipts and expenses for the three past years will stand thus, viz:

	1843.	1844.	1845.
Receipts	$404,141	$428,437	$504,458
Expenses	242,141	233,274	267,848
Net receipts	162,000	195,163	236,610

This road cost $2,914,078, all of which is in the form of stock—there are no loans. The *net* earnings of the road therefore were, in 1843, a fraction over 5½ per cent., and in 1844, a little over 6¾ per cent, and in 1845, a fraction over 8 per cent.

This company however divided 6 per cent. in 1843 and 7½ per cent. in 1844, and will probably divide 8 per cent. in 1845.

From this it will be seen that the Worcester road is doing *exceedingly* well—and that its business is steadily increasing—as well as the Western road. Yet both may, it is thought, be made more profitable by *uniting* them, and thus bring them under *one* management, and of course reduce the cost of working them.

The united cost of these two roads, of 200 miles in length, is $10,600,280, their aggregate earnings for the year 1845 were $1,314,458—their expenses, $632,848, and their net income, $681,610, or *nearly* 6½ per cent. upon the entire cost—and there is very little doubt but that they would, under a united and *wise* management, pay 7½ to 8 per cent. the ensuing year.

A committee was appointed some time since from each company to devise an equitable arrangement for an union, and that committee reported a plan which was deemed fair and equitable. Yet the shareholders of the Worcester, at their late meeting, rejected it by a large majority.

Of the merits of the proposed plan we cannot of course speak, as we have not received official information, but we understood it to be both liberal and equitable—and cannot think but that, if the reported basis of union be the one rejected, the Worcester company have done injustice, both to themselves and to the public. Yet, being without *official* information on the subject, we withhold the expression of our opinion for the present, and ask the two companies for documents from which we may arrive at the truth—as we shall, at an early day, refer to the subject again—as *the whole railroad community* have a direct and deep interest in the union of these two roads, and upon a basis which may serve as a *model* for the numerous unions which *are to follow* in *this* country, as are now going on in Europe. We say this matter *must be adjusted*—and we certainly desire that the *pioneers*—we mean the *early movers* in *Massachusetts*, in favor of railroads—of the Worcester road, should have the *full value* of their exceedingly favorable position; yet they must not be allowed to pursue a course which will raise up a *rival* route, or render the whole railroad interest *obnoxious* to the charge of being "*monopolies*," and thus retard and oppress the system by odious restrictions upon all new works, not even for the benefit of the *pioneers* of the system in Massachusetts. We hope, therefore, that an early and equitable arrangement will be made, and then followed up by *such* a system of management as will promote the interest of all parties—both shareholders and the public.

We again request the gentlemen in the management to furnish us with such facts, or documents, as will enable us to understand the whole matter.

Economy of Oil.

Chilled Boxes and Steeled Journals for Axles.—We have often been led to reflect upon the enormous expense for oil on many of our railroads; and to inquire if there is no remedy—no substitute for, or avoiding of, this enormous expense; but we have not been successful, unless it is to be found in the adoption of the *steeled journal* and the *chilled box*.—We were made acquainted with this peculiar article, about two years since, at Newcastle, Del., where they are manufactured, and had been in use for a length of time, as we were informed, with entire success. And we have been recently informed that a car with steeled journals, and chilled cast iron boxes, filled with *palm oil*, run from some time in *April* to *December*, without the addition of oil, or *any other* lubricating substance, and the journals, after this service, were in good condition. If this be so—and *we* can rely implicitly upon our informant—is it not for the interest of every railroad company in the country to adopt them? The first cost cannot be *much* more than for the ordinary boxes and journals—even though the journals of the axles are plated with *steel*—as the boxes are of *iron*, cast upon a *chill*, and are of course much less expensive than composition boxes.

These articles can be obtained of the Newcastle manufacturing company, we understand, on very favorable terms: and are, we believe, used almost entirely upon some of the southern roads.

The Monongahela Suspension Bridge.—The Pittsburg American says: "This noble structure is now so far complete as to admit of the passage of horsemen. It presents a beautiful appearance, and may be regarded as one of the most splendid as well as substantial structures in our whole country."

This noble and beautiful structure is, it appears, fast approaching completion, another month and carriages and loaded wagons may pass over it.—Thus we see PITTSBURG rapidly restoring those useful and necessary structures of which she was deprived by the great fire of last year. She has indeed passed through a fiery ordeal, but we venture to say that she will be not only purified but also greatly *beautified* by it.

This will be the second structure upon the *suspension* principle completed over the rivers at Pittsburg within the year. The first, a suspension aqueduct for the canal 1150 feet long. This structure is about 1500 feet long, and they have two or three others in contemplation on the same principle, when Pittsburg will be entitled to the appellation of "*the city of suspension bridges*," for which she will be mainly indebted to that accomplished engineer, and excellent mechanic, *John A. Roebling*.

Safety of Passengers on Railroads.

The *safety* of passengers should be one of the very *first* objects of every railroad company. When passengers know that their safety is *cared* for, and that all proper and *known* means are adopted by a company to prevent accidents, they will travel more frequently, and without fear; but, when they feel that the only object is to get the fare, and to hurry them over the ground, or to dilly dally along as best suits the convenience or caprice of the managers, without regard to system, or regularity, or comfort, or even ordinary prudence, none but those who *must*, will, travel.

We have taken up the opinion that it is the *duty* of every railroad company to adopt such improvements—even though they may have to purchase the privilege—as will, *beyond question*, promote the safety of their passengers; and therefore it is that we think they ought to adopt the "*safety beam*," which has, in several instances, prevented sad accidents by the breaking of an axle. In one instance on the Philadelphia and Baltimore railroad, a car, with one of "Kite's safety beams," ran several miles after the axle broke, without even the knowledge of the passengers; and in another case, a car ran more than *one hundred* miles over the Columbia and Harrisburg road, without the knowledge of the passengers or conductor—though the latter knew that *something* was wrong, yet he supposed it was a *wheel loose on the axle*, and so informed those whose duty it was to

repair the cars—but on examination it was found that the axle was broken—and, *but for the safety beam* the whole train might have been thrown off the track, and who can tell the amount of damage, in *dollars*, to the company, in addition to the loss of *time* by delay, and perhaps of *life*, or *limb*, or *both* to the passengers?

We have been led to these remarks by reading in the Philadelphir Ledger, of 27th December, an account of an accident which occurred to the day train on the road near Burlington, N. J., on the afternoon before Christmas. Fortunately, no serious damage was done; yet, had the car had Mr. Kite's safety *beam attached*, instead of Mr. Kite himself *on board*, the accident would not have occurred, and thus delayed a large number of passengers on the road, so as to miss the cars south of Philadelphia.

The following is the statement in the Ledger, which we laid aside for an early insertion, yet which was mislaid until *now*. It has lost nothing however by the delay, and we therefore give it a place, even at this late period, as we intend to notice all such accidents.

"*Railroad Detention.*—On Wednesday afternoon, the train from New York to this city was detained for two hours near Burlington, N. J., in consequence of the breaking of the axle of one of the baggage trucks. No one was injured. * * Had the truck been supplied with safety beams, the train would have travelled hundreds of miles without detention. * * * By this detention, passengers for the south missed the connecting southern line."

PIG IRON.—We would ask the attention of our readers who have occasion to purchase pig iron, to the advertisement of Messrs. *Samuel Kimber, & Co.* of Philadelphia, which appears in another column of the Journal. Iron purchased of them in quantities is, we are informed, shipped from boat to vessel without expense of extra cartage. They are also in the way of shipping at small expense, iron purchased of other furnaces, by manufacturers and dealers at the east.

We have seen beautiful specimens of pig iron from the Spring Mills, and shall soon have samples from each of the above named furnaces, which may be examined at this office by those who desire to purchase.

Title Page and Index.

The title page, and index to the Journal for 1845, has been somewhat delayed. It is now ready, and is forwarded with this number of the Journal. Should any one who receives the Journal, not receive the *index*, or if they have missed any numbers during the past year, and desire to obtain them to make the volume complete, they will do well to apply soon for them. We shall, in all cases, supply them, without charge, if we can do so without breaking a volume.

Newcastle, Del. Locomotive Manufactory.

On a recent visit to Newcastle, Delaware, we passed through the locomotive manufactory and foundry of the "Newcastle Manufacturing company," where we had an opportunity of examining several locomotive engines nearly finished, which do great credit to the gentlemen in charge of that establishment, Mr. Andrew C. Gray, the president of the company and Mr. the machinist and principal manager of the manufactory.

We have before had occasion to speak of the engines from this establishment, which are in use on several of the best railroads in the country, but we had not before seen one of their make to compare with those now nearly completed.

The following are the details of the largest, which are designed, we believe, for the Reading road:

6 driving wheels, connected, 46 inches diameter; cylinders 15 inch diameter, 20 inch stroke; boiler 42 inch diameter; 111 tubes, 11·9 long, 1¼ inside diameter; furnace 4 ft. 6 in. from fire door to tube sheet; 3 ft. 9 in. at bottom for grate bars; 3 ft. 2 in. wide, and 3 ft. 10 in. deep; whole weight of the engine 19 tons with water and fuel. Tender to contain 2,000 gallons water and 2 cords of wood, on 8 wheels, weight equalized.

The weight on the driving wheels is equal, and has apparatus to keep it equal notwithstanding inequalities of the road.

The frame is of wrought iron, with heavy pedestals, welded to the frame and fitted with wedges to keep the journal boxes in adjustment.

These engines are altogether fitted as strongly as the best wrought iron can effect such an object.—The staying of the cylinders and the braces attaching the boiler to the frame are so arranged and so firmly attached that it seems difficult to be excelled, and we doubt not that railroad companies, procuring engines at this establishment, will obtain as good work and as powerful machines as at any manufactory in the country.

Wire Rope,

For Cables, Inclined Planes, Mines and Standing Rigging.—We ask attention to the advertisement of Mr. John A. Roebling, in relation to "*wire rope.*" Mr. Roebling's mode of manufacture is said to be superior to any other in use, either in this, or any other country. It has been extensively used on railroads, in mines and for ships; and he has recently applied it to the *suspension aqueduct*, for the Pennsylvania canal, across the Allegheny river, at Pittsburgh, and also for a suspension bridge across the Monongahela river, at the same place.

Errata.—In Mr. Spaulding's letter, of Dec. 20th, addressed to Edwin F. Johnson, Esq., are the following errors, as published in the Journal of Dec. 25th, 1844. Page 825, twelfth and thirteen lines from top of second column—in place of "twenty thousand dollars," should read *two thousand dollars*; and third line from bottom of the same column—in place of "5,000,000 tons," should read 5,100,000 tons.

The Atmospheric Railway.

We continue the article from the Railway Chronicle, descriptive of the Croydon atmospheric railway. Will some of our American engineers oblige us with their views in relation to this system? We shall wait awhile, before we continue the subject, to give them an opportunity to examine the plans already given, and to give us their views *pro* and *con*, if they will. After a few weeks we shall resume the subject again, for the purpose of enabling our readers to understand what has been done and what is now being done on the iubject.

RAILWAY ACCIDENTS are increasing, of course, from the extension of the system. It is necessary, therefore, that *untiring vigilence* should be exercised by the companies, and by every *individual in their employ*, to prevent their occurrence and sad consequences. *Justice* to the *companies* also requires that a fair and full statement should be given to the public, as well as the *often one-sided* statements given by passengers, when accidents occur; we therefore tender our columns, and *solicit* an *official* report from the superintendent of the road, in *all* cases of accident, for publication.

Railroad Journal, Extra.

We have published an EXTRA sheet of the JOURNAL, containing the *three plans entire* of *atmospyeric* railway, and *parliamentary examination* on the subject, which have appeared in the *four* regular numbers of this volume of the Journal. It will be exceedingly useful to those who desire to become familiar with the subject—and will be found to contain information which cannot be easily obtained elsewhere, in this country, than in the RAILROAD JOURNAL.

An extra number of copies have been printed, which may be had, single, or by the *hundred* and in wrappers by those who wish to send away, or to sell.

☞ We have devoted so much space, in the last few numbers, to the atmospheric, that the Journal has not contained its usual variety; we shall now, however, commence with the *annual reports*, and give one in each number, as they come to hand. We have now in hand the annual report of the Michigan board of internal improvement; the third annual report of the Little Miami railroad company, and the tenth annual report of the Hartford and New Haven railroad company—for which we tender our thanks to those who sent them; and at the same time, request other friends to bear us in *early remembrance* when their reports are *printed*.

For the American Railroad Journal.

I observed in the Journal of the 10th January, 1846, the report of L. O. Reynolds, Esq., chief engineer of the Central railroad, state of Georgia, which concludes with a description of a new track, having a continuous bearing for the rails, united by iron cross-ties. This experimental track, it will be seen, is highly spoken of in the report, as "having kept in much better order than the wooden sleepers, although it was placed on springy earth, where it was difficult to keep the track in adjustment."

Mr. Reynolds, with commendable liberality, gives credit to the judgment and ingenuity of Mr. Wadley for the details of the plan. I beg leave to state, however, for the information of all whom it may concern, that the plan of railway track described in Mr. Reynolds' report will be found delineated on the drawings and described in the specifications of the patent issued to me in 1840.

This plan being, in fact, the first progressive step I made towards perfection in my system of railway structure, and it is so described in my patent.

Railroad companies who desire to use a very cheap, and comparatively good track, may obtain the patent right of doing so at a very moderate cost by applying to the subscriber, who will furnish specifications, and plan, with more perfect proportion of parts, and allow, also, the use of his patent scarfing for the string pieces, dispensing thereby, with the bolster piece, and making a much more perfect and secure joint with less timber.

JAMES HERRON, patentee,
No. 277 south 10th street, Philadelphia, Pa.

Extract from a letter, dated "Newton, Mass., January 6, 1846.

"Enclosed you have $3, for which you will please direct your Railroad Journal * *

"I improve this opportunity to correct an error which I notice in your statistics of American railroads, in relation to the 'Worcester Branch to Millbury,' the length of which you do not state. The cost is stated at $8,431, 'loan or debt,' $506.

"Its length is 3½ miles, and its cost was

about $42,000: heavy edge rail. It was built and is owned by the Boston and Worcester railroad corporation, and consequently has no 'loan or debt.'"

We are obliged to the writer for his civility in thus furnishing us with the means to correct our table of railroads, and also for the enclosure *in advance* for the Journal. We hope to have many such favors immediately after the *fourth* number, accompanied by the *index* to the volume of last year.

☞ With the *index and title page* we have completed the volume, and our labors upon the Journal, for 1845. We will not ask what our *readers* think, in relation to that volume, but we do not hesitate to say that *we* think we have *earned* its price, from those who have received it; and to those who have promptly performed *their* part, and thus aided, and cheered us on during our labors, we tender our *thanks* and kind regards; and to those who have not yet found *time* to enclose the amount due, we wish to say, that it will *now* come very acceptable, and they can, *at the same time*, enclose *five* dollars for the *current* year, thus saving postage—and to *all* our readers we desire to say that we intend to make the Journal worth, to them, its price, and more, if they will aid us by using their influence in extending its circulation and by prompt payment.

☞ To those gentlemen who sent us—one, *six* new subscribers, and $30, and the other *four*, and $20, we desire to express our grateful thanks. Will not other engineers, who have charge of railroads, do likewise? The Journal will be useful both to their *assistants* and to their *stockholders*.

☞ Remittances *always at our risk*.

Northampton and Springfield Railroad.

The Hampshire Gazette of Dec. 16 "says that the cars commenced running their regular trips between Northampton and Springfield, on Saturday morning last. The first passenger train came from Springfield on Friday evening. We took a trip on the road on Saturday afternoon, and, aside from the magnificent specticle brought to view of South Hadley Falls, it was really gratifying to be able to go to Springfield so comfortably, especially on a cold day. We went down and made an *afternoon* and *evening's* visit, and returned at seasonable bed time.

A large number of people assembled to witness the departure of the first train in the afternoon. It was a novel sight to Northampton; and the *natives* although not *astonished*, were highly gratified at the scene.

We are to have three trains a day. Capt. Stoddard, who has discharged the duties of conductor on the Cabot road so acceptably, acts in that capacity on all the trains. A little more than an hour is occupied in passing over the road. Considerable time is occupied in *backing up* to Cabotville. Those who have had the pleasure of backing up to Worcester from the Western road, need not be informed that this operation is something of a nuisance. We trust that this unpleasant feature in the present arrangement will not be of long continuance. This going backwards is decidedly *anti-railroad*.

The track is not yet completed, and the passengers are taken up and deposited at the *freight house*. At the way stations, no houses have yet been erected, but probably will be as speedily as possible. Two stations only are established between Northampton and Cabotville—at Smith's Ferry and Willimansett.—The former is about two miles from South Hadley, and at most seasons of the year will be the more convenient station for the citizens of that place. The Willimansett station will attract the business of South Hadley Falls, it being about a mile and a half below that flourishing and enterprizing village.

The road is undoubtedly as well built as any in the country, and probably better.—Every thing has been done in the most substantial manner, and with a full knowledge of all recent improvements in the construction of such works. The abutments to the bridges are built in a new form, calculated to give them great strength and firmness. The plan was devised by Capt. Childe. The rails are a little heavier, we believe, than those on the Western road. The length of the road is about 17 miles. The depot buildings at Northampton, are very respectable in appearance, save the passenger house, which is too diminutive to look well on the *outside*. The internal arrangement, however, is neat and convenient, and there is ample room for all 'practicable purposes.'"

Thus it will be, *extension* after *extension*, and *branch* after *branch* until *every city* and *town*, of any considerable business in the country, has its railway accommodations. The day is *near* at hand when this road will be extended up the beautiful valley of the Connecticut quite to Canada line, and to Montreal; to Burlington by *two* routes; and from there to Ogdensburgh. The people cannot afford to do without them.

Stages from Northampton.—"Stages from the north connect with the downward trains at 2·10 and 5·12, p.m.; and the same stages return north on the arrival of the trains from Springfield at 1·23 and 4·42, p.m. Two lines of stages from Amherst connect with the early afternoon downward train, and return to Amherst on the arrival of the train at 4·42, which leaves Springfield after the arrival of the Boston, Albany and Hartford trains.—We undesstand that the fare to Amherst is 25 cents, which is cheap enough to satisfy anybody. Regular communication, to accommodate railroad passengers, we believe, is also established between Haydenville and Easthampton,"

This is what we desire to obtain from every line of railroad in the country, *only* we desire the statement to include the stage lines arriving and departing from every stopping place on the railroad and also the names of the principal hotels at each place.

Great Western Railroad and Niagara Falls Terminus.

We are gratified to find in the Rochester American the rumor so satisfactorily put down by Mr. Stuart in the following letter; and we hope that liberal charters will be given for the proposed bridge across the Niagara river. It will not only be of *incalculable* convenience in a business point of view, but it will be a triumph of art over nature which will attract thousands of visitors, and be a *world wide* object of admiration, and it *must* be built.

Mr. Editor—Having been informed that a report has been current in this city within the past few days, that the Great Western railroad company has decided to abandon the idea of the Niagara Falls terminus, and had decided positively to locate at Fort Erie, (which report must have been circulated by the enemies of the Lockport road), I have to request that you inform the citizens of Rochester, who have a deep interest in the question of terminus, of the falsehood of the rumor alluded to, by publishing the following notice from the Hamilton Gazette, Canada West, received by me to-day, by which it will be seen that the company have commenced the survey from Hamilton to the proposed bridge at Niagara Falls. The chief engineer of the Great Western railroad company, informed me last week, that the surveys were directed by him; and were now being made to ascertain the most feasible route to the river, and to the site of the contemplated bridge.

Having been for some time confined to my room by illness, I take this method to caution the public against the false reports circulated by the opponents of the Lockport railroad extension.

CHAS. B. STUART,
Chief Engineer, N. F. & L. R. R. Co.
Rochester House, Jan. 2, 1846.

The following article in relation to the Great Western railroad is from the Hamilton Gazette, and we are right well pleased to see it.

Great Western Railroad.—The survey of this road was commenced last week, by two parties under the direction of H. Strange and Wm. Hale, Esqrs., civil engineers. Mr. Strange commenced on the shore of the bay, at the foot of John-street, and is to gain the summit level of the mountain in an easterly direction, and thence proceed to Fort Erie, opposite Buffalo, and also to the Falls, or the proposed site of the suspension bridge. We understand another line is also to run in an easterly direction, and to make the ascent at or near St. Catharines. Mr. Hale commences his survey at Land's wharf, and is to gain the summit of the mountain in a westerly direction, with a view of continuing to Windsor on the Detroit river.

We understand that other surveying parties will be put upon other portions of the line shortly. The directors are adopting the most energetic measures to have the work completed in the shortest period.

Railroad Meetings.

The Railroad Convention at Geneva.—In our postscript of yesterday morning, says the

Rochester Daily Advertiser, we gave a brief notice of the railroad convention, held at Geneva on the 7th inst., for the purpose of promoting the construction of the Chemung railroad, as a means of completing the great chain of communication between the cities of Philadelphia and Washington and lake Ontario. An address was read to the convention, setting forth the advantages to be realized from the proposed plan, and also a report by Chas. B. Stuart, Esq., civil engineer, under whose direction the route from the head of Seneca lake to the New York and Erie railroad, has been surveyed. According to the table of distances embraced in this report, it seems that the route from Geneva to Philadelphia, via. Elmira, is shortened 140 miles; to New York, 50 miles; and to Washington city, 231 miles. The report estimates the number of passengers who would pass over the whole line of the road, at 50 per day, each way, and 25 way passengers, which for 300 days, would give a total of

60,000 through passenger at	50 cts,	$30,000
30,000 way do. (half way)	25 "	7,500
100,000 tons through freight	25 "	25,000
25,000 " way do.	20 "	5,000
17½ miles U. S. mail at $2 per mile		3,466
Total income - - - - -		$70,966

The estimated expense attending the running of the cars, is 60 to 80 cents per mile, which, on this route at the latter rates, would make an aggregate of $33,600.

The resolutions reported, approves of the project in the strongest terms, and conclude by recommending that an application be made to the legislature for a renewal of the charter of the Elmira and Williamsport railroad, and also for a charter for constructing a railroad from the foot of Seneca lake, to Great Sodus bay in Wayne county. The figuring of income and expense certainly looks very well on paper, but whether it will be realized when in practical operation, remains to be seen.

This movement should be followed up without delay, as there is no latteral line between the Erie and Northern roads, by which so much can be accomplished with so little outlay. We shall give Mr. Stuart's report upon this line—or so much of it as is assential to a proper understanding of the advantages of the line—at an early day.

Atmospheric Railway.

(Continued from page 56.)

I do *not think* a locomotive could have taken those loads around the *curves* on the Dalkey line, at that speed with *equal safety*—certainly not. I was speaking of the development of power, upon a gradient of 1 in 115, with a load of 50 tons.

Taking high velocities into account, I consider that good gradients are positively more essential upon the atmospheric than upon the locomotive, and for the simple reason that I have stated, viz: the moment you get into bad gradients you must have a high vacuum to overcome the resistance, because the word "gradient" is merely an equivalent for "load." It is absolutely nothing else, because whether you have resistance by gravity, or resistance by load, on a level, it is precisely the same thing. The atmosphere requires to work at 16 inches on a level, the more the gradients deviate or increase from the point requiring that vacuum, the worse it is.—For instance on a locomotive line, we increase from a level to 1 in 100, the resistance is immediately doubled or trebled; therefore you have to increase the vacuum from, say 16 inches, which is 8 lbs. per ton, to 22 or 24 inches, and even more; therefore you must either reduce your speed or your load, which is precisely the condition of the atmospheric. This would be still the case if the diameter of the tube was increased.

The velocity depends upon the ratio of the diameter of the pump to the diameter of the pipe, diminishing it by the leakage which takes place; therefore if you diminish your load in proportion to the resistance, or in proportion to the gradient, there is no difficulty in attaining the same velocity on a gradient as upon a flat, if you increase the power; but in a locomotive there is a limit. When you go to a very steep gradient, the locomotive fails not so much in power, but in *bite* upon the rail. It becomes *practically* a useless machine under those circumstances, and in some cases of that kind the atmospheric engine would have no such objection, *because* it does not depend for its progress upon the adhesion of the rail.

I do not think it advantageous to use a locomotive for a passenger train at a gradient of more than 20 or 30 feet in a mile, unless you adopt a plan which is a very good one, of *concentrating* the gradients that are running through the country, in a short space, and maintaining good levels generally.

When a locomotive comes upon a gradient of 1 in 100 its power suffers materially, and so when a train upon the atmospheric comes to a gradient of 1 in 100 it suffers from leakage equally; the two are as nearly equal as possible. When the vacuum is equal to 23 or 24 inches rise of the barometer, the loss is equal to 100 *horse power per mile*; and in speaking of horse power, I desire to be understood as speaking of the actual horse power of 33,000 lbs.

Mr. Stephenson's examination was very lengthy, and very interesting; we can of course only give a few condensed extracts by way of showing the objections raised by him. We shall hereafter give further extracts from his evidence.

Mr. George P. Bidder, also made experiments upon the Dalkey line; the apparatus having been put at his disposal for an entire day—and longer, if he could have remained. He says, "I consider the mechanical problem as having been solved, whether the atmosphere could be made an efficient tractive agent." The only question in my mind was as to the *commercial* application of it. I feel perfectly sure, that unless it could be worked commercially more advantageously than any other system, nothing could command its universal application. The apparatus worked, as far as I observed it, very well. The thing had been brought to a high state of perfection. According to the experiments of Mr. Bidder, the cost per train per mile of the atmospheric, will be 2*s.*; and comparing it with the Norwich and Brandon railway, the power for which is furnished by contract at 20*d. per mile*; maintaining any speed which shall be found practicable, on any other railway in England—and we propose running them 36 miles an hour, including stops—it is clear that the atmospheric principle could not be applied with advantage in a pecuniary point of view.

Mr. Cubitt. I am now having the atmospheric line adapted to the line from London to Croydon, and am going to adopt it from Croydon to Epsom. I have recommended its adoption from London to Portsmouth, and from the Croydon railway to Maidstone, Tunbridge and on to Ashford. The traffic from London to Portsmouth will be a general passenger and goods traffic. I consider that the atmospheric can be well adapted to both passenger and goods traffic, by proper management. And I should prefer the atmospheric under those circumstances that are least adapted to the locomotive; that is to say, in hilly districts, to avoid great expense in the formation of the line of railway; and in those cases where there is a great passenger traffic, requiring to go at short intervals, in great numbers, and very quick. I think it is particularly applicable to begin with for short lines, with a great number of passengers: and I do not know that it is not equally applicable to a long line under similar circumstances. I think as great certainty, with proper management, may be obtained as with any other system. We propose a single line only between London and Portsmouth. I think it will be adequate to the business on that line. We have not yet decided, but I think we shall start trains on the Croydon line every half hour.

All things working right, it makes no difference, the length of line to the number of times you can start the train. If you can do the first interval of *six* miles, and the next adjoining one accurately, every other interval is dependant upon the same principles and the same mode of action. I think it possible to perform the distance from London to Exeter in as short time by the atmospheric, as by the locomotive; I have no doubt of it. I think it also possible to run from Lands End to the utmost extremity of Scotland, by the atmospheric principle without stopping.

A single line of atmospheric, on the same ground with same gradients, will cost about the same money as a double locomotive; but you may alter the grades for an atmospheric, making them higher, but not on a locomotive line, and in that case the single line of atmospheric will cost less than a double line of locomotive.

I estimate the cost of *haulage* upon a locomotive line, at from 9*d* to 1*s*; and upon the atmospheric at from 5*d* to 8*d*. I would take the minimum of the locomotive at 9*d*, and the maximum of the atmospheric at 9*d*. I *believe* the atmospheric may be worked *below* 9*d*., and I know that the locomotive, on the average, will cost more than that. I therefore take 9*d*. as the meeting point, and it will vary up or down, according to circumstances.

The cost of maintenance of way will be less on the atmospheric than on the locomotive line. *That* cannot be denied. The haulage expenses on the Dover line, made out several times by me, come to about 11½d. In the term "haulage" I include the moving power, wear and tear of carriages, and every thing belonging to them—but not the interest on the cost of the plant.

But we must stop here. We might go on and fill the Journal entire from this evidence, with matter of great interest; but want of room and time, now compel us to stop. We shall, however, pursue the subject in the Journal until we have given much of the evidence, which fills more than 190 royal octavo pages.

Debt of New York.—We take the following statement from the governors message in relation to the debts of New York. It shows that "the statement of the canal debt, at the close of the fiscal year, on the 13th day of September last, as given to me from the canal department, is as follows:

Erie and Champlain canal, old debt...	$111,365	54
" " " new debt..	341,474	52
Erie canal enlargement.....	9,933,000	00
Oswego canal.....	421,364	00
Cayuga and Seneca canal.....	237,000	00
Chemung canal.....	648,600	58
Crooked lake canal.....	120,000	00
Chenango canal.....	2,420,000	00
Black river canal	1,544,000	00
Gennessee Valley canal.....	3,794,000	00
Oneida lake canal.....	50,000	00
Oneida river improvement	69,296	13
Making the entire canal debt unredeemed 30th September, 1845, ...	$19,690,020	77

Of this amount, the first item, Erie and Champlain canal, old debt, is provided for; the money deposited in the transfer office, and no interest has been paid upon it ince it fell due, on the 1st day of July last. Yet it is to be paid, is due on presentment, and is therefore a liability against the means of this year. The amount is, ... $111,365.54.

Of Chenango canal stocks there became payable on the first day of the present month,.	2,362,535.66	
	2,473,901	20
Leaving a balance of debt not yet due, of	$17,216,119	57

The whole of the Oswego canal stocks become payable on the first day of July next, and the amount is, ... $421,304 00

Of the Cayuga and Seneca canal stocks there become payable on the first day of July next, the sum of.....	150,000 000	
		$571,304 00
If these liabilities of the present year be met by payment, there will remain a balance of canal debt unredeemed of.....		$16,644,815 57

Canal tolls—Comparative statement.—The annexed statement is from the message of Gov. Wright:

"The tolls upon each of the canals of the state, for the last season of navigation, compared with those of the season of 1844, are as follows:

	1845.	1844.
Erie canal.....	$2,361,810 75	$2,190,147 34
Champlain do	119,432 25	118,739 32
Oswego do	58,438 60	56,164 93
Cayuga & Seneca.	32,486 66	24,618 17
Chemung do	21,517 71	14,835 13
Crooked lake do.	1,943 86	1,497 89
Chenango do	26,567 34	22,177 96
Genesee valley do	23,144 35	19,641 20
Oneida lake do	643 16	621 45
Oneida riv'r imp't	459 10	381 13
Total,.....	$2,646,453 78	$2,446,374 52

Boston and its Advancement.—We re-publish the following extract from a letter dated Boston, January 18th, published in the Tribune, for the purpose of showing the influences of railroads upon our sister city. This is only what any one, familiar with that city, may see, on visiting it at intervals.

"The Granite gangrene, an infection caught of the net-work of railroads which centers at this city, is still eating its way over the face of what were formerly the most fashionable streets. Business is deserting its old localities—Kilby, Central, Water-streets, Liberty-square, &c.—and blocks of magnificent granite front warehouses have been and are being built in Milk, Pearl, Atkinson and Federal-streets to accommodate it. Pearl-street was in years agone the residence of our merchant princes, but their palaces have fallen before this last irruption of the bricks and mortars, in red and white uniforms with granite facings. Milk-street, upon both sides up to Washington-street, is now occupied for warehouses. Federal-street, from Milk to beyond the old Federal-street theatre, is also built up on the west side with granite stores,—Mr. Malcom's church having been torn down to make way for a temple of Mammon. Even as far up as Summer-street, real estate sold a few days since at very high prices, under the speculative impression that in a few years the beautiful mansions that grace that street will also fall before the demand for business accommodations. Indeed, an old resident of Boston, absent a few years, might very easily lose himself upon his return amid the changes which have taken place in the old as well as new portions of the city. The iron gridiron which has been spread out over this and the neighboring states, "the handle toward my hand," by the liberal advancement of capital by Boston moneyed men, has been a large cause of this improvement in business here; but the growth of the woolen and cotton manufactoris, fostered by the judicious legislation of the Congress of 1842, has also been a leading element in the advancement and prosperity of Boston. Crush the tariff, and by this means shut up the mills and workshops of Lowell, Manchester, Nashua, etc., and not all the railroads that center here could prevent a falling off in the commerce and inland business of this city, which would be severely felt."

Snow Storm.—Snow fell in this city, says the Boston Transcript, "on Saturday night, to the depth of 6 or 8 inches. The wind was strong from the northwest, which threw it into drifts. The steamboat mail did not arrive till 1 o'clock this morning, having been 16 hours on the Stonington road. Snow banks were found to the depth of several feet in many places on the rails, and two locomotives employed, but finally became frozen up, and the passengers were obliged to remain in the cars some 3 or 4 hours within 4 miles of Providence, till carriages could be sent for, and conveyed, together with the mails, to the city. The train left Providence with two locomotives, and after having spent some time, were obliged to return and get another locomotive, and were then able to come through.

The Norwich and Stonington boats deemed it unsafe to come farther than Sandy Point, where they anchored and remained till 1 o'clock, and did not arrive at Stonington till 8 o'clock Sunday morning."

The Worcestor train of last evening arrived at about a quarter before nine, but did bring the Western mail [from Springfield and Albany], the train having been detained probably by snow.

The Norwich railroad, so far as our information extends, was open yesterday, but the southern mail, by the way of that road and the Long Island road, had not arrived when this paper went to press."—*Boston Daily Advertiser, Tuesday.*

A New Railroad.—The Cumberland Civilian states that Capt. James Haughey and H. R. Hazelhurst, Esq., have contracted to make a railroad for the Lonaconing and George's creek coal and iron company, which is to intersect the Maryland mining company's road; then the Mount Savage road, and then the Baltimore and Ohio railroad. This road will be 91 miles in length.

Map of the Pennsylvania Works, etc.—We are indebted to some friend, says the Pittsbugh Gazette, of January 9th, for a lithographic map "showing the Pennsylvania improvements, and the Baltimore and Ohio railroad, and other works in New York, Ohio and Michigan, which tend to connect the Ohio river and lakes with the seaboard!" Isaac Craig, del. Pittsburgh, 1845. This is a well constructed and valuable map, and will be carefully studied by every one interested in the right of way, a continuous railroad, etc.

☞ We should like *exceedingly* to be able to acknowledge a similar favor. It would be very convenient and useful in our labors. Who will put us in the way of obtaining one of them?

Dividend.—The Utica and Schenectady railroad have declared a dividend of $4 per share, payable to stockholders in this city, at the Phenix Bank, on the 1st of February.

The Delaware and Raritan and Camden and Amboy railroad company, have declared a dividend of five per cent., payable at their office in this city and Philadelphia, on the 17th inst.

Canal around the Falls of Niagara.—The following notice indicates the revival of the project—or a new one—to construct a canal on the American side. We hope the project may succeed. It has our cordial support; but why the *ferry* if there is to be a *bridge?*

"Notice is hereby given, that an application will be made to the legislature of the state of New York, at its next session, for an act to authorize the construction of a canal of certain dimensions, from the Niagara river, above the Falls of Niagara, to the Niagara river, at or near the village of Lewiston, in Niagara county, with power to hold a certain amount of real estate for manufacturing and other purposes, and a capital not exceeding *two million of dollars.*"

Niagara Falls, Nov. 25, 1845.

"Notice is hereby given, that an application will be made to the legislature of the state of New York, at its next session, for an act incorporating the "*Niagara Falls Ferry Association,*" with a capital of twenty-five thousand dollars, for the purpose of establishing a steam ferry in the gulf between the Falls of Niagara and the whirlpool: construct and maintain carriage ways down the bank, wharves, etc."

Niagara Falls, Nov. 26, 1845.

New Railroad Route.—We invite the careful attention of our readers to the report in this paper of the proceedings of a meeting at Aurora, in favor of a direct railroad from this city, by way of that village, to Hinsdale, there to connect with the New York and Erie railroad. If the advantages of this route are not immensely overrated, and we have no reason to believe they are, the project is well worth consideration. The proposed union, by way of Attica and Hornellsville, is so far advanced, that little doubt can be entertained of its ultimate success. That road ought to be built, and we see no reason why the two projects should necessarily conflict.—*Buffalo Pilot.*

Thus it will be in every part of the country—"another railroad route" will ere long become a "standing head" in every newspaper office in the country.

Montreal Railroad.—The stockholders of the Boston, Concord and Montreal railroad, says the N. H. Patriot, at their meeting at Plymouth, last Thursday, voted to rescind the restriction which had previously been adopted, forbidding the closing of contracts for the substructure of any part of the road, unless the whole line should be let. The directors are now authorized to close contracts for the portion from Concord to Rumney, and then go on with the substructure of the remainder, "wherever, and as soon, and as fast as available means shall be at their disposal to pay therefor," being instructed not to contract "at first, for a less distance than Rumney." The contractors have manifested a readiness to go on according to their proposals. The directors were empowered by the meeting to form a junction with the Northern railroad, if deemed best.

This is as it should be—make the road to Rumney, and then it will make itself. Only get the wedge fairly entered and it will act like the quill of the porcupine, work forward and through, unless it comes in contact with some serious obstacle; which will not be the result in this case.

The Cars.—We are happy to inform our readers that the first train of cars passed over the Central road, from this place east, a few days since. Not the passage cars, to be sure, nor yet the freight cars; but the *dirt* cars—to be employed in the excavations east of us. They are getting well under way up the river, and as soon as the engineers are relieved from the Montpelier investigations, operations will be commenced at this place.—*Burlington (Vt.) Free Press.*

Long Island Railroad.—We learn that an engine, with a snow plough attached, was on Monday thrown from the track, at a point about 30 miles this side of Brooklyn. The engine was much broken, and a person connected therewith was much injured. This accident caused a detention of the Boston train of about 3 hours. The train has for some time past arrived here with great regularity. We learn that this road is now in good running order.—*Boston Journal.*

American Railroad Journal.

The subject of railroads has become one of vast and engrossing importance. It has taken deep root in the estimation of the people of almost every civilized country—and it may justly be esteemed as peculiarly appropriate to the condition of this country.

We are a stirring people; spread over a vast territory, and need, more than any other country, the facilities afforded by railroads to enable us to transact the ordinary business of life, and especially to improve our means of *defence in case of invasion or insurrection.*

That we may *not be behind* the age, and that we *may be always* familiar with the improvements in this important yet *only partially* developed system, it is desirable that a JOURNAL, mainly devoted to the subject, should be published, and widely circulated in *every part of the country.*

It would seem that *every* person interested in the *construction*, or *management*, or *improvement* of railroads; or in the *safety* and *comfort* of passengers; or, in the *increasing value of such investments*, should contribute to its support, not only in the way of subscription, but also by furnishing such facts as experience and observation may, from time to time, furnish them, calculated, if made public, to add to the general stock of knowledge, and to advance the cause.

It is *not* enough that *engineers* and *superintendents* of railroads, are familiar with their details—or that a *few* of those who, *as directors*, have the control of such works, understand their duties. It is *not* enough that the companies are able to divide 3, or 4, or 6, or 10 per cent. per annum. It is the *duty* of *every director*, and of every owner of shares in any railroad—who *may become* a director—to understand, at least the *first principles* of the system, and of its management, that they may know whether their chosen directors, and their paid officers, properly discharge their duties to the proprietors and to the *public.*

To understand the subject properly, it is essential that they should be familiar with the changes and improvements which are being constantly made, as well in Europe as in our own country.

The *best* mode of acquiring this important information is, probably, by personal inspection of the different works in use, and in course of construction; and the next best mode for those who cannot spend the time necessary to make personal examinations, is, to *read* and examine such illustrations of them as may be, from time to time, published.

For the purpose of disseminating such intelligence was THIS JOURNAL established in *December*, 1831; and for this purpose has it been published *for fourteen years past.*

It is *not yet seventeen* years since the *first locomotive* engine was constructed in *Europe*, which could haul *twenty tons* on a *level* road, at the rate of *ten miles* an hour! yet we *now* have engines in use, in *this* country, of *American* manufacture, which can haul, with comparative ease, on a *level* road, TWELVE HUNDRED TONS, at the same velocity!!

Twenty years ago there was not *thirty* miles of railway in use in *all Europe*, except *tram* roads in mines, and in *this* country we had scarcely begun to *think* of their introduction here; yet there is now in Europe *five thousand* miles in use—at a cost of over £100,000,000—and *twice* as many miles *more* in course of construction—and *we* have in this country *over* 4,000 miles in use; and shall have *as* many more miles completed in *less than ten* years!!! thus showing the importance of the *general* dissemination of the most *recent* intelligence on the subject; *especially* as there are now numerous able minds engaged in developing the capabilities of the *locomotive* system, and also of introducing the new, or ATMOSPHERIC, system of propulsion.

This sheet contains *three distinct* plans with engravings of the ATMOSPHERIC RAILWAY, which is commanding so much attention in Europe, and which bids fair to become the popular system of the day, as will be learned from the accompanying opinions of several of the ablest engineers of the age, *Brunel*, *Vignoles*, *Cubitt*, *Locke*, etc., as expressed to the committee of parliament in April last.

Some other articles of interest will also be found in this sheet. To give a better idea of the character and usual contents of the work to those who may receive this sheet, I re-publish the INDEX infull of the *past* volume, of 1845. From *that* it will be seen that it contains a *mass* of information, on various subjects, which *ought* to be in the hands of *every person* interested in railroads; and especially of *directors*, *engineers*, *superintendents and* SHAREHOLDERS.

These are my deliberate views, and I feel assured that an extensive circulation of this, or some *similar* work, will be more useful to the country in disseminating correct information in relation to this *peculiar kind* of improvement,—than to the publisher; I therefore feel at liberty to request, and even to *urge*, those who may receive this sheet, to order it, *at least* for the *present*, and also to recommend it to others, even if they do not also procure the volumes for *past* years—which may be had from July 1838 to January 1, 1847—*thirteen* volumes—12 half bound—for *twenty-five* dollars.

☞ *One set* from the commencement to close of this year, 1846, XIX volumes, can be obtained for *forty-five dollars.*

☞ THE RAILROAD JOURNAL is published on *Saturday* of each week, at 23 Chambers-street, at FIVE DOLLARS a year *in advance.*

☞ *Advertisements*, in relation to *railroads*, *railroad machinery*, *to contractors*, *bridge builders*, *ect.*, *iron*, *and its manufacture*, and other *appropriate* matters, will be inserted in the Journal *once* at the rate of $1 for *twenty lines*, or $2.50 for one month—or $15 for *a year.*

Professional notices, of 6 to 8 lines, fifty cents for an insertion, or $5 for a year.

*** The English *railway* and *scientific* Journals and models of railroad machinery may be found, and examined at the office of this Journal.

All letters, railroad reports, and other communications for the AMERICAN RAILROAD JOURNAL, may be addressed to the undersigned, editor and proprietor,

D. K. MINOR,
23 Chambers-street, N. Y.

☞ We are pleased to learn, as we do from a quarter to be implicitely relied on, that the surveys of the route from Portland to Canada line, show a highly favorable route for the cheap construction of the road.

BOSTON AND MAINE RAILROAD. Upper Route. Boston to Portland via, Charlestown, Somerville, Malden, Stoneham, South Reading, Reading, Wilmington, Ballardvale, Andover, North Andover, Bradford, Haverhill, Atkinson, Plaistow, Newtown, Kingston, East Kingston, Exeter, South Newmarket, Newmarket, Durham, Madbury, Dover, Somersworth, South Berwick, North Berwick, Wells, Kennebunk, Saco and Scarborough.

Winter Arrangement, 1845 & 6. On and after Monday, October 20th, 1845, Passenger Trains will run daily, (Sundays excepted,) as follows, viz.

Leave Boston for Portland at 7½ a.m. and 2½ p.m. Leave Boston for Great Falls at 7½ a.m., 2½ p.m. and 3½ p.m. Leave Boston for Haverhill at 7½ a.m., 2½, 3½ and 5 p.m. Leave Portland for Boston at 7½ a.m., and 3 p.m. Leave Great Falls for Boston at 6½ a.m., 9½ a.m. and 4½ p.m. Leave Haverhill for Boston at 6½, 8½, and 11 a.m., and 6½ p.m.

Special Train.—A special train will leave Boston for Andover at 11½ a.m., and Andover for Boston at 3½ p.m.

The Depot in Boston is on Haymarket Square.

Passengers are not allowed to carry Baggage above **$50** in value, and that *personal* Baggage, unless notice is given, and an extra amount paid, at the rate of the price of a Ticket for every **$500** additional value.

CHAS. MINOT,
October 20, 1845. 43 1y *Super't.*

SPRING STEEL FOR LOCOMOTIVES, Tenders and Cars. The Subscriber is engagep in manufacturing Spring Steel from 1½ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used, its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address

JOAN F. WINSLOW, *Agent,*
j5a3 Albany Iron and Nail Works, Troy, N. Y.

A. & G. RALSTON & CO., NO. 4 South Front St., Philadelphia, Pa.

Have now on hand, for sale, Railroad Iron, viz:
180 tons 2½ x ½ inch Flat Punched Rails, 20 ft. long.
25 " 2½ x ½ " Flange Iron Rails.
75 " 1 x ½ " Flat Punched Bars for Drafts in Mines. A full assortment of Railroad Spikes, Boat and Ship Spikes. They are prepared to execute orders for every description of Railroad Iron and Fixtures. 1tf

MACHINE WORKS OF ROGERS, Ketchum & Grosvenor, Patterson, N. J. The undersigned receive orders for the following articles, manufactured by them of the most superior description in every particular. Their works beingextensive and the number of hands employed beinglarge, they are enabled to execute both large and small orders with promptness and despatch.

Railroad Work.

Locomotive steam engines and tenders; Driving and other locomotive wheels, axles, springs & flange tires; car wheels of cast iron, from a variety of patterns, and chills; car wheels of cast iron with wrought tires; axles of best American refined iron; springs; boxes and bolts for cars.

Cotton, Wool and Flax Machinery

of all descriptions and of the most improved patterns, style and workmanship.

Mill gearing and Millwright work generally; hydraulic and other presses; press screws; callenders; lathes and tools of all kinds; iron and brass castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,
a45 Paterson, N. J., or 60 Wall street, N. York.

FOR SALE AT A SACRIFICE—A LOCOmotive Engine, 4 wheels and Tender. Cylinders 10 in. dia., Stroke 16 in., Cylinders inside of smoke box. Weight of engine, with wood and water, about 9 tons. This engine and tender are new, and of the best materials and workmanship. If required, would be altered to a 6 wheeled engine.

Also, 1 20-horse High Pressure Steam Engine.
2 8-horse " " "
1 Upright Hydraulic Press.

All of which will be sold low, on application to
T. W. & R. C. SMITH.
Founders and Machinists,
My 12tf Alexandria D. C.

GEORGIA RAILROAD. FROM AUGUSTA to ATLANTA—171 MILES. This Road in connection with the South Carolina Railroad and the Western and Atlantic Road now forms a continuous line of Railroad of 360 miles from Charleston to Cartersville, two miles west of the Etowa River in Cass County.

Rates of Freight, and Passage from Augusta to Cartersville.

On Boxes of Hats, Bonnets, and Furniture per foot.....15 cts.
" Dry goods, shoes, saddlery etc., per. 100 lbs. 85 "
" Sugar, coffee, iron, hardware, etc. " 70 "
" Flour, bacon, mill machinery etc. " 33½ "
" Molasses, per hogshead $9; salt per bus...22 "

Passengers $9 50; children under 12 years of age and servants, half price.

Passengers to Atlanta, head of Ga. Railroad, $7.

German or other emigrants, in lots of 20 or more, will be carried over the above roads at 2 cents per mile.

Goods consigned to S. C. Railroad Co. will be forwarded free of commissions. Freight payable at Augusta.

J. EDGAR THOMPSON,
Ch. Eng. and Gen. Agent.
Augusta, Oct. 21 1845. *44 1y

NICOLL'S PATENT SAFETY SWITCH for Railroad Turnouts. This invention, for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design.

It acts independently of the main track rails, being laid down, or removed, without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two Castings and two Rails; the latter, even if much worn or used, not objectionable.

Working Models of the Safety Switch may be seen at Messrs. Davenport and Bridges, Cambridgeport, Mass., and at the office of the Railroad Journal, New York.

Plans, Specifications, and all information obtained on application to the Subscriber, Inventor, and Patentee.

G. A. NICOLLS,
ja45 *Reading, Pa.*

GEORGE VAIL & CO., SPEEDWELL IRON Works, Morristown, Morris Co., N. J.—Manufacturers of Railroad Machinery; Wrought Iron Tires, made from the best iron, either hammered or rolled, from 1½ in. to 2½ in thick.—bored and turned outside if required. Railroad Companies wishing to order, will please give the exact inside diameter, or circumference, to which they wish the Tires made, and they may rely upon being served according to order, and also punctually, as a large quantity of the straight bar is kept constantly on hand.—Crank Axles, made from the best refined iron; Straight Axles, for Outside Connection Engines; Wro't. Iron Engine and Truck Frames; Railroad Jack Screws; Railroad Pumping and Sawing Machines, to be driven by the Locomotive; Stationary Steam Engines; Wro't. Iron work for Steamboats, and Shafting of any size; Grist Mill, Saw Mill and Paper Mill Machinery; Mill Gearing and Mill Wright work of all kinds; Steam Saw Mills of simple and economical construction, and very effective Iron and Brass Castings of all descripions.t
ja451y

TO RAILROAD COMPANIES AND MANufacturers of railroad Machinery. The subscribers have for sale Am. and English bar iron, of all sizes; English blister, cast, shear and spring steel; Juniata rods; car axles, made of double refined iron; sheet and boiler iron, cut to pattern; tiers for locomotive engines, and other railroad carriage wheels, made from common and double refined B. O. iron; the latter a very superior article. The tires are made by Messrs. Baldwin & Whitney, locomotive engine manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside.

THOMAS & EDMUND GEORGE,
ja45 N. E. cor. 12th and Market sts., Philad., Pa.

NORWICH AND WORCESTER RAIL-Road. On and after May 22, 1845, Trains will leave as follows, viz:—

Accommodation Trains, daily, except Sunday. Leave Norwich, at 6 a.m., and 4½ p.m. Leave Worcester, at 10 a.m., and 4½ p.m.

☞ The morning train from Norwich, and the morning and evening trains from Worcester, connect with the Boston, Western, and Hartford and Springfield railroads.

New York Train, via Steamboat. Leaves Norwich for Worcester and Boston, every morning except Monday, upon the arrival of the boat from New York, about 2 a.m. Leaves Worcester for Norwich and New York, at 5½ p.m., daily, except Sunday.

New York Train, via Long Island Railroad.—Leaves Norwich about 3 p.m., for Worcester and Boston, daily, except Sunday. Leaves Worcester for Norwich and New York, at 7½ a.m., daily, except Sunday, and arrives in Norwich at 9½.

Freight Trains. Daily, except Sunday.

☞ Fares are less when paid for Tickets, than when paid in the cars.

EMERSON FOOTE,
32 1y Superintendent.

LAWRENCE'S ROSENDALE HYDRAulic Cement. This cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight papered barrels, by

JOHN W. LAWRENCE,
142 Front street, New York.

☞ Orders for the above will be received and promptly attended to at this office. 32 1y

WESTERN AND ATLANTIC RAIL-road. The Western and Atlantic Railroad is now in operation to Marietta, and will be opened to Cartersville, in Cass county, on the 20th of October—and to Coosa Depot, (formerly known as Borough's,) on the 20th of November.

The passenger train will continue, as at present to connect daily (Sundays excepted) with the train from Augusta, and the stage from Griffin.

CHAS. F. M. GARNETT.
43 *Chief Engineer.*

LITTLE MIAMI RAILROAD. — DIStance 65½ Miles. Fare, **$1 50.** From 1st November to 1st March Passenger Trains leave Cincinnati for Xenia at 11 o'clock, A.M.

Returning, leaves Xenia at 8½ o'clock, A.M.

Freight Trains run daily, Sundays excepted.

At Xenia, Passenger Trains connect with daily lines of stages to Columbus, Wheeling, Cleveland and Sandusky city.

W. H. CLEMENT,
1y 1 Supt. and Engineer.

RAILROAD IRON.—THE "MONTOUR Iron Company," Danville, Pa., is prepared to execute orders for the heavy Rail Bars of any pattern now in use, in this country or in Europe, and equal in every respect in point of quality. Apply to

MURDOCK, LEAVITT & CO.,
Agents.
Corner of Cedar and Greenwich Sts. 49 1y

C. J. F. BINNEY,

GENERAL COMMISSION MERCHANT and Agent for Coal, and also Iron Manufactures, etc.

No. 1 City Wharf, Boston.

Advances made on Consignments.

Refer to Amos Binney, *Boston.*
Grant & Stone, } *Philadelphia.*
Brown, Earl & Erringer, }
Weld & Seaver, *Baltimore.*
December 8, 1845. 1m 5c

BACK VOLUMES OF THE RAILROAD JOURNAL for sale at the office, No. 23 Chambers street.

NEW YORK AND HARLEM RAILROAD Company.—Winter Arrangement.

On and after November 3d, 1845, the cars will run as follows:

Leave City Hall for Yorkville, Harlem, Morrisiana, and Williams' Bridge,

7 30 A.M. This train leaves 27th st.
7 30 " Does not stop this side of Harlem.
10 30 " Does not stop this side of Harlem.
11 30 "
1 P.M. Does not stop this side of Harlem.
2 30 "
3 30 " Does not stop this side of Harlem.
4 30 "

Leave White Plains for City Hall—8·10, 11·10 a.m., and 1·45, 4·10 p.m.

Leave Tuckahoe for City Hall—8·20, 11·20 a.m., and 1·55, 4·20 p.m.

Leave Williams' Bridge for City Hall—8·45, 11·45 a.m. and 12·45, 2·15, 3·45, 4·45, and 5·45 p.m.

Leave Morisiana for City Hall—8, and 9·10 a.m., and 12·10, 1·10, 2·40, 4·10, 5·10, and 6·10 p.m.

The freight train will leave City Hall at 12·45 p.m. and leave White Plains at 11·10 a.m. All freight must be at the City Hall between the hours of 10·30 a.m. and 12·30 p.m. The White Plain trains will stop, after leaving the City Hall, only at the corner of Broome street and the Bowery, Vauxhall Garden and 27th street.

An extra car will precede each train, 10 minutes before the time of starting from the City Hall, and will take up passengers along the line.

The City Hall and 27th street line will run every 6 minutes from 7·30 a.m. to 8 p.m.

The City Hall and 27th street night line will run every 20 minutes from 8 to 12 o'clock.

On Sundays the trains will be regulated according to the state of the weather. 1y 46

THE LONDON RAILWAY RECORD, Edited by Mr. JOHN ROBERTSON, A. M., (connected from the commencement with the Weekly Railway press of England.)

The *Railway Record* is acknowledged to be the leading English Railway Journal, and is published twice a week in London, namely on Wednesday and Saturday. It contains copious and correct reports (by special reporters) of all railway meetings in the United Kingdom; ample Share Lists and Traffic Tables, showing the length, cost, capital and selling prices in the principal markets, with Editorial articles on the leading Railway topics of the day. The *Railway Record* contains also, a complete resume of French, Belgian and other foreign Railway affairs.

Subscriptions 13*s.* per quarter, to be transmitted in advance to Messrs. Dawson and Sons, Ca[illegible] st. London. Office 153 Fleet street, London. 46

BOSTON COURIER, DAILY, SEMI- Weekly and Weekly.

The *Daily* edition of the Courier, presents to merchants and others, an extensive medium of advertising. The circulation of the *Semi-Weekly* Courier (pubiished on Mondays and Thursdays) is believed to be more extensive than that of any other similar Boston Newspaper. This publication embraces all the reading matter of the Daily, the Foreign and Domesuc Markets, Review of the Boston Market, Prices current, and Ship News, prepared with great accuracy. The *Weekly* Courier contains as much of the matter of the daily as can be crowded into a sheet of the same size, without ship news, prices current or advertisements.

Our extions to obtain and publish authentic information on all topics proper for the columns of a newspaper,—the state of trade, the prices of merchandize, the current news of the day, and the political movements in the various sections of the country—will not be abated. The marine department of the Courier has been inferior to none in copiousness or accuracy of detail, and it will be our endeavor maintain its reputation in this respect.

TERMS OF ISUBSCRIPTION.

For the Daily Courier, for one year, in advdnce $8,00
For the Semi-Weekly Courier, for one year.. 4,00
For the Weekly Courier, for one year..... 2,00

JOSEPH T. BUCKINGHAM.
EBIN B. FOSTER.

BALTIMORE AND OHIO RAILROAD. MAIN STEM. The Train carrying the Great Western Mail leaves Baltimore every morning at 7½ and Cumberland at 8 o'clock, passing Ellicott's Mills, Frederick, Harpers Ferry, Martinsburgh and Hancock, conncting daily each way with—the Washington Trains at the Relay House seven miles from Baltimore, with the Winchester Trains at Harpers Ferry — with the various railroad and steamboat lines between Baltimore and Philadelphia and with the lines of Post Coaches between Cumberland and Wheeling and the fine Steamboats on the Monongahela Slack Water between Brownsville and Pittsburgh. Time of arrival at both Cumberland and Baltimore 5½ P. M. Fare between those points $7, and 4 cents per mile for less distances. Fare through to Wheeling $11 and time about 36 hours, to Pittsburgh $10, and time about 32 hours. Through tickets from Philadelphia to Wheeling $13, to Pittsburgh $12. Extra train daily except Sundays from Baltimore to Frederick at 4 P. M., and from Frederick to Baltimore at 8 A. M.

WASHINGTON BRANCH.

Daily trains at 9 A. M. and 5 P. M. and 12 at night from Baltimore and at 6 A. M. and 5½ P. M. from Washington, connecting daily with the lines North, South and West, at Baltimore, Washington and the Relay house. Fare $1 60 through between Baltimore and Washington, in either direction, 4 cents per mile for intermediate distances. s13 1y

CENTRAL RAILROAD—FROM SAVANnah to Macon. Distance 190 miles.

This Road is open for the transportation of Passengers and Freight. Rates of Passage, $8 00. Freight—

On weight goods generally... 50 cts. per hundred.
On measurement goods..... 13 cts. per cubic ft.
On brls. wet (except molasses and oil).....$1 50 per barrel.
On brls. dry (except lime)... 80 cts. per barrel.
On iron in pigs or bars, castings for mills, and unboxed machinery..... 40 cts. per hundred.
On hhds. and pipes of liquor, not over 120 gallons.....$5 00 per hhd.
On molasses and oil.....$6 00 per hhd.

Goods addressed to F. WINTER, Agent, forwarded free of commission. THOMAS PURSE,
40 Gen'l. Sup't. Transportation.

LEXINGTON AND OHIO RAILROAD. Trains leave Lexington for Frankfort daily, at 5 o'clock a.m., and 2 p.m.

Trains leave Frankfort for Lexington daily, at 8 o'clock a.m. and 2 p.m. Distance, 28 miles. Fare $1·25.

On Sunday but one train, 5 o'clock a.m. from Lexington, and 2 o'clock p.m. from Frankfort.

The winter arrangement (after 15th September to 15th March) is 6 o'clock a.m. from Lexington, and 9 a.m. from Frankfort, other hours as above.
35 1y

KEARNEY FIRE BRICK. F. W. BRINLEY, Manufacturer, Perth Amboy, N. J. Guaranteed equal to any, either domestic or foreign. Any shape or size made to order. Terms, 4 mos. from delivery of brick on board. Refer to

James P. Allaire, Peter Cooper, Murdock, Leavirt & Co. } New York.
J. Triplett & Son, Richmond, Va.
J. R. Anderson, Tredegar Iron Works, Richmond, Va.
J. Patton, Jr. Colwell & Co. } Philadelphia, Pa.
J. M. L. & W. H. Scovill, Waterbury, Con.
N. E. Screw Co. Eagle Screw Co. } Provicence, R. I.
William Parker, Supt. Bost. and Worc. R. R.
New Jersey Malleable Iron Co., Newark, N. J.
Gardiner, Harrison & Co. Newark, N. J.

25,000 to 30,000 made weekly. 35 1y

RAILROAD IRON AND FIXTURES. The Subscribers are ready to execute orders for the above, or to contract therefor, at a fixed price, delivered in the United States.

DAVIS, BROOKS & CO.,
js 30 Wall st., N. York.

BOSTON AND PROVIDENCE RAILroad. Passenger Notice. Winter Arrangement. On and after Monday, Nov. 3, the Passenger Trains will run as follows:

For New York—night line, via Stonington.—Leaves Boston every day, but Sunday, at 4½ p.m.

Accommodation trains, leave Boston at 8 a.m. and 3½ p.m., and Providence at 8 a.m. and 3½ p.m.

Dedham trains, leave Boston at 9 a.m. 3, 5½ and 10 p.m. Leave Dedham at 8 and 10½ a.m., and 4½ and 7 p.m.

Stoughton trains, leave Boston at 12 m. and 4 p.m. Leave Stoughton at 8·20 a.m. and 2½ p.m.

All baggage at the risk of the owners theneof.

N.B. The last train to and from Boston and Dedham, will be omitted in case of a severe snow storm. W. RAYMOND LEE, *Sup't.* 31 1y

BRANCH RAILROAD and STAGES CONnecting with the Boston and Providence Railroad.

Stages connect with the Accommodation trains at the Foxboro' Station, to and from Woonsocket. At the Seekonk Station, to and from Lonsdale, R. I. via Pawtucket. At the Sharon Station, to and from Walpole, Mass. And at Dedham Village Station, to and from Medford, via Medway, Mass. At Providence, to and from Bristol, via Warren, R. I.—Taunton, New Bedford and Fall River cars run in connection with the accommodation trains.

NEW YORK AND ERIE RAILROAD LINE. For Middletown, Goshen, and intermediate places. Two daily lines each way, as follows:

For passengers, the new, and commodious steamboat St. Nicholas, Capt. Alex. H. Shultz, will leave the foot of Duane street daily, [Sundays excepted,] at 7½ o'clock, A.M., and 5 o'clock, P.M., through in five hours. Returning, the cars will leave Middletown at 6, A.M., and 4½, P.M. For further particulars inquire of J. Van Rensselaer, Agent, corner of Duane and West streets.

H. C. SEYMOUR, Superintendant.

Stages run from Middletown daily, in connection with the afternoon line, to Bloomingburg, Wurtsboro, Monticello, Mt. Pleasant, Binghampton, Owego, Port Jervis, Honesdale Carbondale, etc.

On Monday, Wednesday, and Friday, to Dundaff, Montrose, Friendsville, Lenox, Brooklyn, etc., etc. 31 1y

BALTIMORE AND SUSQUEHANNA Railroad. The Passenger train runs daily except Sunday, as follows:

Leaves Baltimore at 9 a.m., and arrives at 6½ p.m. Arrives at York at 12½ p.m., and leaves for Columbia at 1½ p.m. Leaves Columbia at 2 p.m., and leaves York for Baltimore at 3 p.m. Fare to York $2. Wrightsville $2 50, and Columbia $2 62½. The train connects at York with stages for Harrisburg, Gettysburg, Chambersburg, Pittsburg and York Springs.

Fare to Pittsburg. The company is authorized by the proprietors of Passenger lines on the Pennsylvania improvements, to receive the fare for the whole distance from Baltimore to Pittsburg. Baltimore to Pittsburg.—Fare through, $9 and $10.

Afternoon train. This train leaves the ticket office daily, Sundays excepted, at 3½ p.m. for Cockeysville, Parkton, Green Springs, Owings' Mills, etc.

Returning, leaves Parkton at 6 and Cockeysville and Owings' Mills at 7, arriving in Baltimore at 9 o'clock a.m.

Tickets for the round trip to and from any point can be procured from the agents at the ticket offices or from the conductors in the cars. The fare when tickets are thus procured, will be 25 per cent. less, and the tickets will be good for the same and following da[illegible] any passenger train.

D. C. H. BORDLEY, *Sup't.*
31 1y Ticket Office, 63 North st.

DAVIS, BROOKS & Co., 30 WALL ST. Have now on hand and for sale,

200 tons 2½ x ½ inch Flat punched Rails, Bars 18 feet each.
100 tons Heavy Edge Rails, 90 tons per mile.
30 tons 2½ x ½ inch Flat Rails.

ALSO—A STEAM PILE DRIVER, built by "Dunham & Co." which has never been used, and cost originally $5000. s90 2m